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IN THE  
**United States Court of Appeals**  
FOR THE NINTH CIRCUIT

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WAIALUA AGRICULTURAL COMPANY, LIMITED,  
*Appellant*

v.

CIRACO MANEJA, ET AL., *Appellees*

---

On Appeal from the District Court of the United States  
for the District of Hawaii.

---

**BRIEF FOR APPELLANT**

---

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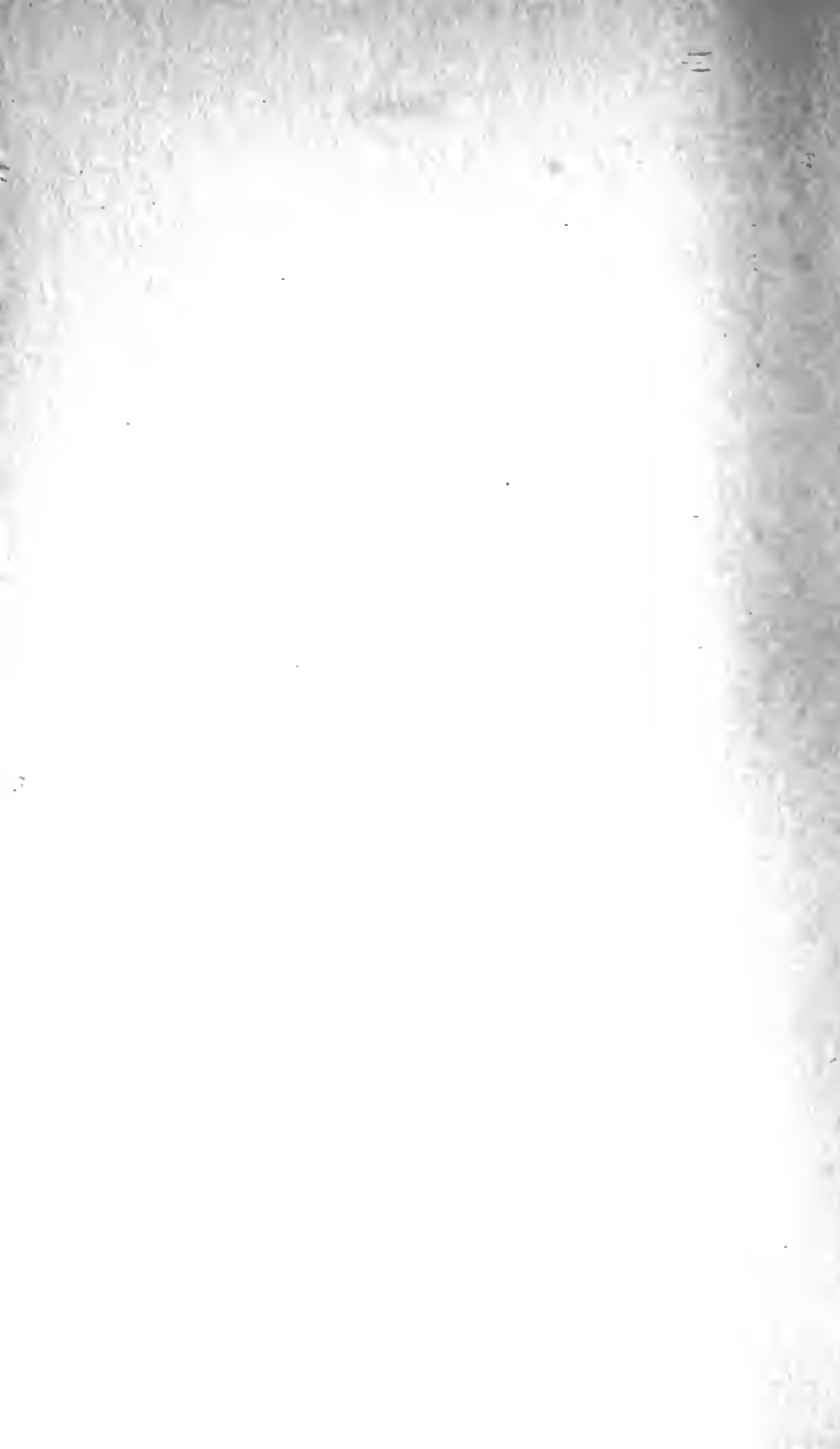
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IN THE  
**United States Court of Appeals**  
FOR THE NINTH CIRCUIT

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No. 13114

---

WAIALUA AGRICULTURAL COMPANY, LIMITED, *Appellant*,  
v.

CIRACO MANEJA, ET AL., *Appellees*.

---

On Appeal from the District Court of the United States  
for the District of Hawaii

---

**BRIEF FOR APPELLANT**

---

**NATURE OF ACTION**

This is the second appeal to this court in this action. The action was originally brought by Waialua Agricultural Company, Limited, hereinafter called the appellant, as a class action under Rule 23(a) of the Federal Rules of Civil Procedure and was instituted pursuant to Section 274d of the Judicial Code, now set forth as 28 U.S.C. section 2201, to secure a declaratory judgment. The defendants named in the original complaint were (a) employees of appellant, (b) a union which was the collective bargaining representative of such employees, and (c) a union official. The court was requested to declare the rights of the parties in a controversy relating to the judicial construction of Sections 3(b), 3(f), 3(j), 7(a), 7(c), and 13(a)(6) of the Fair Labor Standards Act of

1938 (the Act of June 25, 1938, 52 Stat. 1060, 29 U.S.C. sections 201 *et seq.*) hereinafter sometimes called the Act. The defendants filed a counterclaim under Section 16(b) of the Act to recover unpaid overtime compensation for work performed by them as employees of appellant and to recover liquidated damages, costs, and attorney's fees, but the district court ordered a separate trial of said counterclaim to take place subsequent to the court's determination of the issues presented by the declaratory judgment aspect of the action.

Following a trial of the action for declaratory judgment, a decision of the district court (77 F. Supp. at 480), and an appeal to this Court, the action was remanded by this Court to the district court for further proceedings (178 F. (2d) 603).

Upon remand all pleadings were amended by the parties so as to limit the action to the period November 20, 1946, to and including September 14, 1947 (R. 7, 10, 16-18), and were further amended, with the approval of the district court, so as to eliminate the class representation aspects of the action and to drop certain parties defendant (R. 4-5). The parties defendant left in the action were 42 individuals employed by the appellant during all or part of said period. Forty of these individuals are the appellees herein, the other two not being involved in the appeal because the district court held that they were exempt from the overtime requirements of the Act under Secs. 13(a)(6) and 3(f) during said period, and no appeal was taken by any party from such holding (R. 308-10, 325, 339).

Pursuant to an order of the district court following the remand, all issues presented in the declaratory judgment action and in the appellees' counterclaim were tried in a single trial (R. 5-6).

In conformity with the directions of this Court (178 F. (2d) at 606-607, 608, 614), following the remand, a Record was made showing the following with respect to each employee defendant:

1. The particular workweeks worked by him during the period of time covered by the litigation.

2. The number of hours worked by him in each such workweek.

3. His compensation in each such workweek including the amount of overtime compensation paid him and the number of hours for which such overtime compensation was paid.

4. A description of the duties performed by him in each such workweek.

And the district court entered detailed findings of fact (R. 190 *et seq.*, 308 *et seq.*) as to each appellee which showed the following:

1. The workweeks during the period of time covered by the litigation which were not in controversy either because the appellee had not worked in excess of 40 hours in any such workweek or because, if he had worked such excess hours, he had received overtime compensation therefor at the rate of time and one-half his regular hourly rate of pay pursuant to the collective bargaining contract applicable to his employment.

2. As to each of the other workweeks during the period of time covered by the litigation, which weeks were in controversy, a detailed description of the work performed by the appellee, the number of hours worked by him, his regular hourly rate of pay, whether or not he had received overtime compensation for hours of work in excess of 40,<sup>1</sup> and whether or not he was exempt under either Section 13(a)(6) or Section 7(c).<sup>2</sup>

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<sup>1</sup> In the case of some appellees there were certain workweeks when they received overtime compensation for hours of work in excess of 40 per week, but there is a controversy between the parties as to whether appellant was obligated under the Act to pay such overtime e.g., R. 311 (appellee Hernandez), 315 (appellee Cumlat) and 318 (appellee Hamamoto).

<sup>2</sup> As the district court found, appellant paid overtime to all appellees for hours worked by them in excess of 48 in a workweek, and therefore the recovery of overtime pay sought in this action by appellees is limited to hours in excess of 40 per week, up to and including 48. 97 F. Supp. at 219. Appellant's payment of overtime for hours in excess of 48 in a week was made pursuant to the applicable collective bargaining contract. (R. 141, 143).

## JURISDICTION

Jurisdiction was conferred upon the district court by (a) Section 24 of the Judicial Code as amended, now set forth as 28 U.S.C. section 1337, (b) Section 274d of the Judicial Code, now set forth as 28 U.S.C. section 2201, and (c) Section 16(b) of the Fair Labor Standards Act of 1938. The pleadings necessary to show the existence of the jurisdiction and setting forth the controversies between the parties are: (a) Amended Complaint (R. 6-15); (b) Amendment to Amended Complaint (R. 181-184); (c) Answer to Amended Complaint, and Counter-claim, Cross-Claim, and Cross-Complaint (R. 16-19); (d) Reply and Answer to Counter-Claim, Cross-Claim, and Cross-Complaint (R. 20-24); and (e) Amendment to Answer to Amended Complaint, and Counter-Claim, Cross-Claim, and Cross-Complaint (R. 24-26). The Opinion and Decision of the district court are reported at 97 F. Supp. 198. The district court also entered findings of fact and conclusions of law (R. 190 *et seq.*, 308 *et seq.*) which are not reported. Likewise the Judgment of the district court (R. 321 *et seq.*) is not reported. This Court has jurisdiction to review the judgment below under Sections 116 and 128 of the Judicial Code as amended, the pertinent parts of which are now set forth as 28 U.S.C. sections 41, 1291, 1294.

## STATUTORY PROVISIONS INVOLVED

The provisions of the Fair Labor Standards Act involved are Sections 3(b), 3(f), 3(j), 7(a), 7(c), and 13(a) (6). These will be set forth in full or in relevant part in appropriate places in the Argument, *infra*.

## STATEMENT OF THE CASE

All material facts in this action found by the district court are set forth in a lengthy Stipulation of the parties (running 771 pages) filed in the district court on August

30, 1950, hereinafter cited as "Stip."<sup>3</sup> Of the 48 defendants below 22 testified orally, and all supported the truth and accuracy of the Stipulation except in certain minor respects (e.g. R. 409-410, 423-424, 434-435, 446-447, 458-459. See also R. 615-617, 619, 620-621.) In such minor respects the Stipulation was thereafter amended by the parties to conform with such oral testimony (R. 179-181; Amendment to Stipulation filed September 5, 1950. See also R. 618-619.)<sup>4</sup> Twenty of the 22 defendants who testified orally are among the appellees herein. The other

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<sup>3</sup> This Stipulation has not been printed in full in the printed record, although it is among the original papers transmitted to this court by the district court (R. 341, 671). By order of this Court dated November 28, 1951, the parties were excused from printing such Stipulation in full but the Court nevertheless ordered that it should be treated under Rule 19, ¶6 of the Court's Rules as part of the Record to be considered on this appeal. (R. 713-16, 719) The parts of the Stipulation, which are printed in the printed record, are (a) Part I, containing an overall description of the appellant's plantation and its operations; (b) those portions of Parts II and III, containing a description of and other data relating to the work and duties of the appellees, which the appellant deemed necessary to show the error in various findings of the district court, and (c) exhibits A, B, D, F, G, H, & I attached to the Stipulation. (R. 27-178, 721-724). On the other hand, there has been omitted from printing those portions of Parts II and III of the Stipulation which are adequately and correctly covered by the district court's findings (R. 190, *et seq.*). All page references in this brief to the parts of the Stipulation not printed are to the pagination of the Stipulation as filed in the district court and not to the pagination of the Stipulation as it appears in the original record certified to this Court.

<sup>4</sup> There were two amendments to the Stipulation (R. 179 and 186). The first of these, entitled "Amendment to Stipulation," consists almost wholly of a further elaboration of the work and duties of the appellees. Like the Stipulation itself, this Amendment to Stipulation has not been printed in full in the printed record, although it too is among the original papers transmitted to this Court (R. 341, 671). The parts printed are those which the appellant deemed necessary to show the error in various findings of the district court. (R. 179-181). Again, this Court by its order of November 28, 1951, excused the parties from printing said Amendment to Stipulation in full but ordered that it should nevertheless be treated under Rule 19, ¶6 of this Court's Rules as part of the Record to be considered on this appeal. (R. 716-17, 719).



two were those held exempt by the district court from the overtime requirements of the Act during all workweeks of the period covered by the litigation under Sections 13(a) (6) and 3(f). *Supra*, p. 2.

The facts agreed to by the parties, applicable to the period involved herein (R. 123), show that

Appellant operates a sugar plantation on the island of Oahu. Since 1898 appellant has been engaged almost exclusively in the growing, cultivating, and harvesting of sugar cane on land owned or leased by it (R. 31) and the processing of such sugar cane into raw sugar and molasses on the plantation where produced (R. 30, 31, 38-39, 721). *The appellant processes no cane except that grown by itself on its plantation* (R. 84), nor does it engage in any sugar refining operations (R. 32).<sup>5</sup> Substantially all of the land (9,663 acres) now devoted to sugar cane production has been owned or leased and used by appellant for this purpose since 1910 (R. 33).

On its plantation appellant prepares and plows the fields for the planting of sugar cane; plants sugar cane; ratoons the fields;<sup>6</sup> cultivates sugar cane; applies fertilizer to the cane fields; irrigates cane fields by a network of irrigation ditches and water storage reservoirs; harvests sugar cane; maintains a network of field roads (which criss-crosses the cane-growing land (R. 35)) for the transportation by truck of labor, field supplies and equipment throughout the plantation; and transports sugar cane by a narrow-gauge railroad (which also criss-crosses the cane growing land (R. 35)) from the fields where grown to the appellant's mill.<sup>7</sup> These operations

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<sup>5</sup> The court below found that appellant does not "directly" engage in any sugar refining operation. 97 F. Supp. at 203. This finding is erroneous because the Record shows clearly that appellant does not engage in any such operation, directly or indirectly.

<sup>6</sup> "Ratooning" refers to operations performed after a field is harvested to prepare it for the growing of another crop (R. 42).

<sup>7</sup> The parties have stipulated that the term "mill" means the building and equipment of the appellant used in the actual processing of sugar cane into raw sugar, including cane carrier, cane

are more fully described in the Stipulation (R. 39-66).

The appellant's mill is located on its plantation (R. 38). At the mill the appellant grinds the sugar cane which it produces into raw sugar and molasses and loads bagged raw sugar and molasses for shipment to the continental United States, or stores such products temporarily in the sugar warehouse or molasses tanks (R. 66-82, 84-85). The loading of the bagged raw sugar and of the molasses into the railroad cars of an independently owned and operated carrier at the site of the mill, and the pushing of such cars from such site onto a nearby spur of the carrier complete the operations of the appellant and the work of its employees relative thereto (R. 31-32, 59).<sup>8</sup>

Appellant has equipped and maintains complete service shops for prompt minor repairs and emergency work and major overhaul of field and processing machinery, equipment and facilities indispensable to its growing, harvesting and processing operations. These service repair shops are located in an area extending not more than 300 feet from the mill building proper (R. 94, 723).

Appellant owns and maintains 820 dwelling houses, all of which are located on the plantation (R. 120); and various facilities and services, including firewood, water, electricity, sewage disposal, street maintenance and cleaning, and recreational facilities are provided the occupants of such dwelling houses (R. 118, 119). These dwelling houses are occupied by 3373 persons, of whom 2952 are employees and pensioners of the

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cleaning plant and scales, crushing plant, boiling house, fireroom, power plant, sugar warehouse and molasses tanks, and all equipment therein (R. 31).

<sup>8</sup> The carrier referred to discontinued its operations at the end of the year 1947. Such carrier had previously been used not only to carry the appellant's bagged raw sugar and molasses but also to deliver incoming plantation supplies and equipment. The outgoing and incoming freight of appellant's plantation are now handled by an independently owned and operated trucking company (R. 59-60).

appellant and their families. The remaining 421 persons living in such houses are lessees and their families who are not employed by the appellant and who either work off the plantation or who own, operate or are employed by independently controlled businesses within it (R. 120-121). No employee, including each of the appellees herein, is required as a condition of employment to live on the plantation or in plantation dwelling houses or to use any service or facility which the appellant furnishes or renders its employees (R. 120). The relationship which exists between the appellant and its employees by virtue of the occupancy of such houses, including each and every employee appellee herein, is that of landlord and tenant (R. 120).

For the convenience of the court in understanding our Argument, we set forth below the groups of activities which appellees performed for appellant:

1. *Field work and repair and maintenance of field equipment*: (i) preparation of land for planting, planting, ratooning, cultivation, fertilizing, irrigation, harvesting, and maintenance of field roads (appellees Maneja, Asuncion, Hayashi, K. Okouchi, Watanabe (R. 191-204) and appellee Crisostomo (R. 279-283)); (ii) repair, servicing, and maintenance of field equipment and implements, such as tractors, tractor auxiliary implements, caneloading machines, and pumps and other irrigation equipment (appellees last mentioned and also appellees Ezawa (R. 231-235), Reyher (R. 239-243), A. Robello (R. 273-276), Tanaka (R. 227-231), Takata (R. 243-248), Hironaka (R. 266-273), Yamada (R. 277-278), and Sunahara (R. 223-226)).

2. *Hauling and repair and maintenance of hauling equipment*: (i) hauling by narrow gauge railroad of sugar cane from fields to mill (appellee Holmberg (R. 205-206)); (ii) hauling by truck on field roads of laborers and field supplies and equipment used for planting, cultivation and harvesting (appellees Guigui (R. 235-239), Vierra (R. 248-256), and Crisostomo (R. 279-283)); (iii) miscellaneous hauling such as hauling by truck of laborers, supplies, and equipment to different places on plantation (appellees

Guigui (R. 235-239), Vierra (R. 248-256), and Crisostomo (R. 279-283)) (some of this latter type of hauling consisted of hauling from off the plantation to places on the plantation); (iv) repair, servicing, and maintenance of hauling equipment and facilities such as cane cars, locomotives, trucks, and the plantation railroad, including portable tracks (appellees K. Okouchi (R. 198-201), Holmberg (R. 205-206), Faria (R. 206-208), Sera (R. 208-210), T. Okouchi (R. 210-212), Claunan (R. 220-223), Sunahara (R. 223-226), Tanaka (R. 227-231), Takata (R. 243-248), Mori (R. 264-265), Hironaka (R. 266-273), and A. Robello (R. 273-276)).

3. *Sugar Cane Processing and Repair and Maintenance of Processing Equipment*: (i) Processing of sugar cane at mill and temporary storage, loading, and shipment of raw sugar and molasses (appellees Hernandez, Dumlao, Kondo, Cumlat, Lazo, and Kubo (R. 310-317); Carrit and S. Robello (R. 216-220); and Hamamoto (R. 317-318)); (ii) repair, servicing, and maintenance of mill and its equipment (appellees last mentioned and also appellees Oato (R. 212-216), Sunahara (R. 223-226), Tanaka (R. 227-231), Takata (R. 243-248), and Hironaka (R. 266-273)).

4. *The making of concrete irrigation flumes*, water supply pipe, blocks, and other concrete products required for use on the plantation (appellee Tsutsui (R. 257-258)).

5. *Storage of supplies and equipment* for field, hauling, mill, and repair activities of appellant (appellee Yack Chun Lee (R. 318-319)).

6. *Laboratory work* for (i) field operations of appellant (appellee Pacheco (R. 285-286)) and for (ii) hauling, processing, and activities referred to in "8", *infra* (appellee Fujiwara (R. 286-288)).

7. *Office work* (appellee Sakaguchi (R. 319-320)).

8. *Repair and maintenance of appellant's dwelling houses* and the furnishing, maintaining, repairing, or servicing of related domestic services or facilities to or for the lessees of such dwelling houses (appellees Sakai (R. 256-257), Kashiwabara (R. 259-263), Mori (R. 264-265), Yamada (R. 277-278), Fernandez (R. 284), Crisostomo (R. 279-283), Oato (R. 212-216), Hironaka (R. 266-273), Guigui (R. 235-239), and Vierra (R. 248-256)).

Certain appellees performed work in only one group of activities in every workweek and are therefore listed only in that group. This is true, for example, of the employees who are grouped under sugar cane "Processing," *supra*. On the other hand, certain appellees in some workweeks performed one group of activities exclusively, but in other workweeks performed a substantial amount of work in two or more groups of activities. For example, appellee Yamada in certain workweeks did carpentry work in repairing appellant's dwelling houses (R. 277, 278) and did nothing else. In other workweeks, however, he did both such carpentry work on dwelling houses and also repaired irrigation equipment (*Id.*). Accordingly, he is grouped both under "Field work" and "Repair and maintenance of appellant's dwelling houses," *supra*. Still other appellees did a substantial amount of work in many workweeks which fell into several groups of activities, and in no workweek did work that fell into one group exclusively, e.g., appellees Hironaka (R. 266-273), Takata (R. 243-248), and Tanaka (R. 227-231). They are therefore placed in several groups.<sup>9</sup>

### **Opinion and Decision (Including Findings of Fact and Conclusions of Law) and Judgment of District Court**

The district court wrote a lengthy opinion (97 F. Supp. 198), and, as we have pointed out, *supra*, p. 3, also entered detailed findings as to each appellee. It then entered a Judgment (R. 321 *et seq.*), holding that each appellee was engaged in commerce or in the production of goods for commerce within the meaning of Section 7(a) of the Act during each workweek of the period of litigation (R. 322). The court further held with respect to each appellee (and as to the workweeks in controversy as to him) those workweeks when he was, and those when

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<sup>9</sup> In various instances appellees who did only minor amounts of work within a particular group of activities are not listed above as within the group. Complete information as to the work done by all of the appellees within the various groups appears in the findings of fact (R. 190 *et seq.*, 308 *et seq.*)

he was not, exempt from the provisions of Section 7(a) pursuant to Section 13(a)(6) or Section 7(c) (R. 322 *et seq.*).

In this connection and with particular reference to the "agriculture" exemption provided by Section 13(a)(6), the district court held that when appellant had finished growing its sugar cane crops and proceeded to haul such crops from the fields where grown to its mill on the plantation, it ceased to be a farmer and became a carrier. 97 F. Supp. at 218, 222. Accordingly, appellees engaged in such hauling were not within the exemption. Similarly, the court held that after the crops reached the mill on the plantation and appellant processed them into raw sugar, it ceased to be a carrier and became a manufacturer (97 F. Supp. 218, 222), and therefore the appellees engaged in such processing were likewise not under the "agriculture" exemption. The court also held that so far as the repair shops of appellant were concerned, they were an integral part of the overall combination of separate enterprises, i.e., farming, hauling, and manufacturing, conducted by the appellant and hence appellees doing the repair work were also not exempt. 97 F. Supp. 225.

The court in its Judgment further held that if in any workweek an appellee performed work which was exempt from the overtime provisions of the Act by virtue of Section 13(a)(6) or Section 7(c), the exemptions would be lost in that workweek if the appellee also did any other work not so exempt, regardless of how insubstantial such other work was (R. 336).

Finally and based upon its holdings as aforesaid, the court awarded unpaid overtime compensation, liquidated damages, costs of the action, and attorney's fees to the appellees as claimed by them in their counterclaim (R. 336-338).

### QUESTIONS PRESENTED

The basic question presented by this appeal is whether the 40 appellees were entitled to overtime compensation

under the Act for all hours worked by them over 40 in all or any of the workweeks covered by the litigation.

Stated more precisely the issues presented are the following:

1. Whether the appellees were exempt from the overtime provisions of the Act by virtue of Sections 13(a)(6) or 7(c) during all or any of the workweeks covered by the litigation.

2. Whether the appellees were excluded from the overtime provisions of the Act by virtue of their not being "engaged in [interstate] commerce or in the production of goods for [interstate] commerce" as the terms "commerce" and "produced" were defined in Sections 3(b) and 3(j)<sup>10</sup> of the Act when they were engaged in: (a) repairing and maintaining appellant's dwelling houses located on the appellant's planation, and (b) furnishing, maintaining, repairing or servicing related domestic services or facilities (firewood, water, electricity, bath houses, sewage disposal, street maintenance and cleaning, parks and playgrounds, clubhouse and other recreational facilities) to or for the lessees of such dwelling houses who included both employees of appellant and others.

3. Whether if during the same workweek an appellee performed work, some of which was exempt under Section 13(a)(6) and the remainder exempt under Section 7(c), or performed work, some of which was not an engagement in interstate commerce or in the production of goods for interstate commerce and the remainder of which was exempt under Section 13(a)(6) or Section 7(c), he was exempt for that workweek from the overtime provisions of the Act.

4. Whether if during the same workweek in the period covered by the litigation an appellee engaged in an activity exempt under Section 13(a)(6) or Section 7(c) of the Act and did not engage for a substantial part of his time in the same workweek in an

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<sup>10</sup> Sections 13(a)(6), 7(c), 3(b) and 3(j) were all amended by the Fair Labor Standards Amendments of 1949 (63 Stat. 910) effective January 25, 1950. The amendments do not affect the controversy here, which antedates such amendments (*Supra*, p. 2).



activity not so exempt, he was exempt for that workweek from the overtime provisions of the Act by virtue of Section 13(a)(6) or Section 7(c).

## SPECIFICATION OF ERRORS

A. The district court erred as follows with respect to the workweeks affected by the controversy in this action:

1. In holding that each and every appellee was engaged in interstate commerce or in the production of goods for interstate commerce within the meaning of Section 7(a) of the Act in each such workweek, and in failing to hold that each such appellee was not engaged in interstate commerce or in the production of goods for interstate commerce when he was engaged in: (a) repairing and maintaining appellant's dwelling houses located on the appellant's plantation, and (b) furnishing, maintaining, repairing or servicing related domestic services or facilities (firewood, water, electricity, bathhouses, sewage disposal, street maintenance and cleaning, parks and playgrounds, clubhouse and other recreational facilities) to or for the lessees of such dwelling houses who included both employees of appellant and others.

2. In holding that an appellee was not "employed in agriculture" within the meaning of Section 3(f) and therefore was not exempt from the overtime provisions of the Act as provided by Section 13(a)(6) when he was engaged in any of the following: (a) hauling of sugar cane produced by appellant from the fields to the mill and repairing, maintaining, and servicing equipment and facilities used in such hauling; (b) grinding such sugar cane at the mill into raw sugar and molasses, and repairing, maintaining, and servicing the mill and its equipment; (c) temporarily storing, loading, and shipping such raw sugar and molasses; (d) repairing and maintaining field implements, and (e) such other incidental operations as were necessary and indispensable to the foregoing, such as hauling and storing supplies, materials and equipment, and laboratory and office work for appellant's field, hauling and processing operations.

3. In holding that an appellee was also not exempt

from the overtime provisions of the Act under Section 7(c) when he was engaged in any of the following: (a) hauling of sugar cane produced by appellant from the fields to the mill and repairing, maintaining, and servicing equipment and facilities used in such hauling; (b) repairing, maintaining, and servicing the mill and its equipment, and (c) such other incidental operations as were necessary and indispensable to the foregoing or to the grinding of sugar cane produced by appellant at the mill into raw sugar and molasses, or to the temporary storage, loading, and shipment of same, such as the hauling or storage of materials, supplies and equipment, or laboratory and office work.

B. The district court erred in failing to hold as follows with respect to the workweeks affected by the controversy in this action:

1. That an appellee was exempt from the overtime provisions of the Act during any workweek in which

(a) he performed work, some of which was exempt from Section 7(a) under one provision of the Act and the remainder of which was exempt from Section 7(a) under another provision or other provisions of the Act, or

(b) he performed work, some of which was not in "[interstate] commerce" or in the "production of goods for [interstate] commerce" within the meaning of Section 7(a) and the remainder of which was exempt from Section 7(a) under any provision or provisions of the Act.

2. That an appellee was exempt from the overtime provisions of the Act during any workweek in which he performed some work which was exempt from Section 7(a) of the Act and did not engage for a substantial part of his time in the same workweek in an activity which was not so exempt.

C. The district court erred in awarding any overtime compensation, liquidated damages, costs, and attorney's fees to appellees or any of them (R. 336-338).

D. The district court erred in relying upon and crediting defendants' Exhibits Nos. 2, 3A and 3B, which were

incompetent, irrelevant and immaterial. 97 F. Supp. at 203, 204, 205, 214, 216, 217, 221, 224.

E. The district court clearly erred in making findings of fact which are in conflict with the Stipulation of Facts submitted by the parties (R. 30 *et seq.* and Stip. pp. 87 *et seq.*) and are not supported by competent and substantial evidence, oral or documentary, introduced at the trial in the district court. Said clearly erroneous findings are set forth in Appendix A, pp. 79-90, *infra*.

## ARGUMENT

**I. THE APPELLEES WERE "EMPLOYED IN AGRICULTURE" WITHIN THE MEANING OF SECTION 3(f) AND THEREFORE WERE EXEMPT FROM THE OVERTIME PROVISIONS OF THE ACT AS PROVIDED BY SECTION 13(a)(6) WHEN THEY WERE ENGAGED IN ANY OF THE FOLLOWING DURING THE PERIOD COVERED BY THE LITIGATION:**

**(a) HAULING OF SUGAR CANE PRODUCED BY APPELLANT FROM THE FIELDS TO THE MILL AND REPAIRING, MAINTAINING, AND SERVICING EQUIPMENT AND FACILITIES USED IN SUCH HAULING;**

**(b) GRINDING SUCH SUGAR CANE AT THE MILL INTO RAW SUGAR AND MOLASSES, AND REPAIRING, MAINTAINING, AND SERVICING THE MILL AND ITS EQUIPMENT;**

**(c) TEMPORARILY STORING, LOADING, AND SHIPPING SUCH RAW SUGAR AND MOLASSES;**

**(d) REPAIRING AND MAINTAINING FIELD IMPLEMENTS; AND**

**(e) SUCH OTHER INCIDENTAL OPERATIONS AS WERE NECESSARY AND INDISPENSABLE TO THE FOREGOING.**

Appellant contends that the agriculture exemption applied to appellees when engaged in hauling sugar cane to the mill, processing such cane into raw sugar and molasses, repairing the hauling and processing equipment and facilities, and such other incidental operations as were necessary and indispensable to the hauling, processing and repair activities, such as hauling and storing supplies, materials and equipment, and laboratory and office work for appellant's field, hauling and processing operations.<sup>11</sup>

The district court denied that appellees were within the agriculture exemption when engaged in any of such activities. The district court held that the agriculture exemption, as applied to appellees, was limited to field operations, and ended at the point where cane cars, loaded with harvested cane, left portable track in the cane fields and moved on to permanent rail tracks of appellant's narrow-gauge railroad to continue the transportation of such cane to the mill. (R. 59-62). 97 F. Supp. at 220-222.

The underlying philosophy which motivated the district court in so delimiting the agriculture exemption was its view that appellant was engaged in five separate businesses, namely, those of farmer, carrier, manufacturer, shipper, and operator of village communities. 97 F. Supp. at 218, 222, 225.

In the foregoing and in other respects, the district court's holding stands in sharp contrast with many com-

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<sup>11</sup> When this case was previously before this Court, this Court expressed concern that the first decision of the district court necessarily held that the carpenter who initially constructed a house for an Army officer on company property and the beauty operator who worked in a hotel for transients and the girl who took tickets at the moving picture house in a plantation village were engaged in commerce; and this Court further expressed concern over the possibility that appellant might claim that such persons were included under the agriculture exemption. 178 F. (2d) at 609. In the opinion of appellant, any such persons would not be engaged in commerce and also would not come within the agriculture exemption. None of the appellees was engaged in work of the types mentioned.

ments with respect to the application of the agriculture exemption which were made by this Court in its earlier opinion in this same case. Thus, this Court emphasized that

1. The agriculture exemption should not be construed technically, but broadly and liberally as is demanded by the nature of the subject and the unquestionable intent of Congress. 178 F(2d) at 608, 609.

2. Size, mechanization, and industrialization of appellant's operations were immaterial factors in determining whether the exemption applied to the individual appellees. *Id.* p. 610.

3. The application of the exemption should be determined for each workweek for each appellee solely on the basis of said appellee's work in each such workweek. *Id.* pp. 608, 611, 614.

4. The perishability of the crop, i.e., sugar cane, was an extremely pertinent fact in determining whether the agriculture exemption applied to the appellees when engaged in hauling such cane to the appellant's mill and in processing it into raw sugar. *Id.* p. 611.

5. The agriculture exemption in Section 13(a)(6) and the sugar processing exemption in Section 7(c) are not alternative or mutually exclusive. *Id.* p. 609.

The district court completely ignored the several comments of this Court as to how the agriculture exemption should be applied.<sup>12</sup> In fact, aside from stating that this Court had remanded the case to it, the district court made no mention of this Court's earlier exhaustive opinion herein.

Instead, as it had done in its prior decision (77 F. Supp. 480), the district court relied extensively upon defendants' exhibits Nos. 3A and 3B, which were introduced over appellant's objections (R. 650-652), in making its findings and reaching its legal conclusions (97

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<sup>12</sup> The opinion of the district court is based almost entirely on the brief submitted to the district court by counsel for appellees, which brief also ignored the comments of this Court.

F. Supp. at 203, 204, 205, 214, 216, 217, 221, 224), notwithstanding that this Court had previously indicated that such exhibits were of no relevancy to the issues here involved. 178 F(2d) at 612. Said exhibits were two bulletins of the U. S. Department of Labor numbered 687 and 926, respectively.<sup>13</sup> Neither bulletin has any probative value. They were not introduced to prove what the appellees' activities were during the workweeks in issue, nor did the appellees make any effort to show that their activities during such workweeks were comparable to those described in the bulletins. And in fact nothing in either bulletin applies to the appellant or the appellees or their operations and activities; and said bulletins may not be relied upon to modify the stipulated facts. Furthermore, one of these bulletins, namely No. 687, was issued in 1939 and obviously, even if otherwise relevant, would be entitled to no weight in this case which pertains simply to the period November 20, 1946, to September 14, 1947.

**A. The Courts Have Held the Agriculture Exemption To Be Far Reaching and To Include Many Activities Not Normally Regarded as Farming.**

Section 13(a)(6) of the Act exempts from both the wage and hour provisions thereof "any employee employed in agriculture". Section 3(f) defines the term "agriculture" as follows:

"'Agriculture' includes farming in all its branches and among other things includes the cultivation and tillage of the soil, dairying, the production, cultivation, growing, and harvesting of any agricultural or horticultural commodities (including commodities defined as agricultural commodities in section 15(g) of the Agricultural Marketing Act, as amended), the

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<sup>13</sup> While the parties have been excused from printing such exhibits, this Court has ordered them treated under Rule 19, ¶6 of this Court's Rules as part of the Record to be considered on this appeal (R. 711, 712), and copies thereof have been supplied the Court.

raising of livestock, bees, fur-bearing animals, or poultry, and any practices (including any forestry or lumbering operations) performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market.”

It will be noted that the exemption starts with the growing of the agricultural commodity, continues with its harvesting, includes its preparation for market or delivery to storage, and ends with its delivery to market or to transportation for market.

In its only holding on the agriculture exemption in the Act the United States Supreme Court stated:

“As can be readily seen this [agriculture] definition has two distinct branches. First, there is the primary meaning. Agriculture includes farming in all its branches. Certain specific practices such as cultivation and tillage of the soil, dairying, etc., are listed as being included in this primary meaning. *Second, there is the broader meaning. Agriculture is defined to include things other than farming as so illustrated.* It includes any practices, *whether or not themselves farming practices*, which are performed either by a farmer or on a farm, incidently to or in conjunction with ‘such’ farming operations” [Emphasis supplied]. *Farmers Reservoir Co. v. McComb*, 337 U.S. 755 at 762-763.

Thus the Supreme Court has made it clear that the exemption applies to all practices performed by a farmer or on a farm incident to or in conjunction with farming, whether or not such practices are themselves farming practices. And in an earlier decision the Supreme Court stated that “Employment in agriculture is probably the most far reaching” of the exemptions in the Act. *Addison v. Holly Hill Fruit Products*, 322 U.S. 607, 612.

This Court itself has recognized that the agriculture exemption in the Act must be construed broadly and liberally with respect to sugar cane farming. In its prior decision herein, it stated:

“... the raising and harvesting of sugar were specifically given consideration by Congress on account of the immense importance to the economy of this country as a whole. The text of the Act itself, the debates over the meaning of provisions, and especially the broad phrasing of the exclusions, *indicates the intention that construction should be evenly balanced and not technical*. The text reflects the feeling that, in troublesome times, the need for sugar may momentarily become vital. . . . It must be remembered that the construction given to this Act by the Court as to Hawaii, although not conclusive, will be generally applied to wheat farms and sugar plantations in continental United States.

“... As has hitherto been pointed out by this Court . . . , *these provisions relating to farming are exclusions, not technical exemptions to be construed in accordance with over-refined rules of pleading, but broadly and liberally as is demanded by the nature of the subject and the unquestionable intent of Congress*. This factor is directly applicable to the individual employee because the Act specially provides that the statute shall not apply to any employee who is engaged in agriculture” [Emphasis supplied]. 178 F.(2d) 608-609.

The size, mechanization and industrialization of particular activities are irrelevant factors in determining the application of the exemption. This Court so recognized in its earlier opinion in this case:

“It is probable that no feasible distinction can be drawn under the language of the statute between carriage by motor truck, railroad locomotives or other modern devices, and by water buffalo with carts, as the statutory cleavages are on other lines. . . . distinctions cannot be drawn on account of size. If a particular operation in transportation were done, according to the facts, by a farmer in harvesting, it would not fall under the statutory provisions even if the farmer were an agricultural giant such as Waialua” 178 F.(2d) at 610.

Other decisions hold that the agriculture exemption applies in accordance with its terms, notwithstanding the



mechanized or industrialized character of the operations involved: *Damutz v. Pinchbeck*, 66 F. Supp. 667 (D. Conn. 1946), 158 F(2d) 882 (C.C.A. 2),—agriculture exemption held to apply to fireman in greenhouse notwithstanding that the growing of horticultural products was highly mechanized; *Miller Hatcheries v. Boyer*, 131 F(2d) 283 (C.C.A. 8)—agriculture exemption held applicable to employees in a commercial chick hatchery located in a city notwithstanding that the hatching of baby chicks by a commercial hatchery is an industrialized activity; and *Bruno v. Hills Brothers Co.*, 7 Labor Cases, paragraph 61763 (D. Puerto Rico 1943)—agriculture exemption held applicable to employees engaged in canning and packing grapefruit and curing of citron raised by the employer on its own farms.<sup>14</sup>

Appellant's field operations are no less mechanized than its mill or hauling operations (R. 56-57, 115-116) and the district court so found, 97 F. Supp. at 204. Hence if mechanization of operations was determinative of the application of the exemption, exemption would be denied such obviously agricultural operations as plowing, planting, weeding, irrigating, or harvesting—all done by mechanized equipment.

The district court ignored the foregoing authorities and instead construed the agriculture exemption so narrowly that it denied exemption to the appellees when engaged in many activities which are commonplace, everyday activities of farmers, including hauling of crops to a

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<sup>14</sup> In denying the exemption, the district court relied on the size, mechanization and industrialization of appellant's transportation and processing operations, and the district court also relied upon such other irrelevant matters as the marketing of appellant's products through a cooperative refinery in California, the relationship of appellant to Hawaiian Sugar Planters Association, the relationship of appellant to its agent Castle & Cooke, Ltd., the departmentalization of appellant's operations, and the past prosperity of appellant. 97 F. Supp. at 203, 216-218, 221-222. Reliance on any of the foregoing matters was inconsistent with the rule that the agriculture exemption should be determined for each workweek for each appellee solely on the basis of said appellee's work in such workweek. 178 F. (2d) at pp. 608, 611, 614.

processing plant, processing the crops to prepare them for market, and repairing agricultural equipment, machinery, and implements. 97 F. Supp. at pp. 220-222, 222-223, 225.

The district court also appeared to take the view that the Section 13(a)(6) exemption should not include the sugar processing operation in which some of the appellees engaged, because there is a specific exemption for such sugar processing in Section 7(c). 97 F. Supp. at 221. But again this reasoning was contrary to the previous decision of this Court herein, when it said:

“These provisions [Sections 13(a)(6) and 7(c)] are not alternative or mutually exclusive . . .” 178 F.(2d) at 609.

The agriculture exemption in Section 13(a)(6) and the processing exemption in Section 7(c) overlap in many significant respects. The overlapping of the two exemptions is fully understandable. Section 13(a)(6) is an exemption from both the wage and hour provisions of the Act, while Section 7(c) is an exemption from the hour provisions alone. Congress intended that if a farmer processes his own sugar cane crops, such processing should be exempt under Section 13(a)(6). On the other hand, if a person engages in the business of processing crops of others, such person was to enjoy only the more limited Section 7(c) exemption.

**B. The Language of the Exemption, Which Includes (1) “Farming in All Its Branches” (2) “And Any Practices . . . Performed by a Farmer or on a Farm as an Incident to or in Conjunction with Such Farming Operations”, Exempted the Work of Appellees Now In Question.**

1. *“Farming in All Its Branches”.*

Under the primary meaning of the agriculture exemption all branches of farming are exempt. The statutory language defining “agriculture” reads in relevant part:

“ ‘Agriculture’ includes farming in all its branches and among other things includes the cultivation and tillage of the soil, dairying, the production, cultivation, growing, and harvesting of any agricultural or horticultural commodities . . . ”

As observed earlier, *supra*, p. 10, many of the appellees were engaged in a variety of tasks in all or many of the workweeks affected by the controversy in this action. Included among such tasks were the hauling of sugar cane produced by appellant from the fields to the mill on appellant's plantation; repairing, maintaining, and servicing equipment and facilities used in such hauling; grinding sugar cane produced by appellant at the mill; repairing, maintaining, and servicing the mill and its equipment; repairing and maintaining field implements; hauling laborers, materials, supplies or equipment; storing materials, supplies, or equipment; laboratory work; office work; and grading field roads. In performing such various tasks in any given workweek an appellee was engaged in sugar cane farming within the meaning of the exemption, as all such activities were a necessary and integral part of the appellant's operations of producing, cultivating, growing, and harvesting sugar cane. (R. 35-36, 94). All such activities were similar to the activities conducted by vast numbers of wheat farmers, cotton farmers, fruit and vegetable farmers, etc., in various areas of the country. This point was underscored by the American Farm Bureau Federation<sup>15</sup> in a brief *amicus* filed with this Court when the case was previously before it, in which the Farm Bureau explained that the activities of the appellees herein were “common everyday activities performed by most Ameri-

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<sup>15</sup> This is a non-profit general farm organization of more than 1,250,000 farm families in 45 states of the United States and Puerto Rico. Its objects are to promote, protect, and represent the business, economic, social, and educational interests of the farmers of the United States and generally to develop agriculture. See *Brief of Farm Bureau*, Appendix B hereto, page 92, *infra*.

can farmers and farms". *Brief of Farm Bureau*, Appendix B hereto, pp. 92-93, 96-97, *infra*.

The district court, denying the applicability of the agriculture exemption to appellees engaged in hauling, mill, repair, and many other activities of appellant, asserted that appellant is engaged in a number of separate and distinct enterprises, which, taken together, constitute a hybrid type of business, and that in the conduct of these enterprises appellant has assumed a variety of functions including those of farmer, carrier, manufacturer, and shipper. 97 F. Supp. at 218, 222, 225.<sup>16</sup> These statements betray an acute lack of understanding of the usual farming operations of farmers in the United States, its territories and possessions. All of appellant's activities now in question, as we have previously shown, are functionally identical with the activities conducted by untold numbers of farmers. *Brief of Farm Bureau*, pp. 92-93, 96-97, *infra*. It is therefore misleading to call the appellant a "carrier", "shipper", "manufacturer", etc., in addition to a farmer. Every farmer is a "carrier" or "shipper" in the sense that he transports and hauls his products from the fields to storage, to market, to a processor, or to a carrier for transportation to market. Every farmer also is a "carrier" in the sense that he transports from one part of the farm to another agricultural supplies and agricultural equipment and in the further sense that he sends his trucks to a nearby town and hauls back necessary farm supplies and equipment.

Furthermore, every farmer is a "manufacturer" to the extent to which he transforms the product he grows into marketable condition. Many fruit and vegetable farmers can or pack their own fruits and vegetables;

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<sup>16</sup> The court also stated that appellant has assumed the functions of an operator of village communities. We shall address ourselves in a subsequent part of this brief (*infra*, pp. 57-74) to the question of the applicability of the coverage and exemption provisions of the Act to the appellees engaged in maintaining the dwelling houses located on appellant's plantation and furnishing related domestic services and facilities to the occupants thereof.

many cotton farmers gin their own cotton; and many dairy farmers process their own milk into butter and cheese. All of this is done preparatory to marketing. *Brief of Farm Bureau*, pp. 93, 96-97, *infra*. Such a farmer is as much a farmer within the statute as a farmer who does less. The statute of course does not reduce "farmer" to the lowest common denominator of farming.

*The Term "Harvesting" as Applied to the Facts Here Includes the Hauling of Sugar Cane From the Fields to the Mill and the Processing of Such Cane Into Raw Sugar.*

As the Supreme Court pointed out in the *Farmers Reservoir* case (337 U.S. at 762), various specific practices are listed in the statute as being included in the primary meaning of the "agriculture" exemption. One of the practices so specifically listed is "harvesting of . . . agricultural . . . commodities". "Harvesting" is defined as "to gather in a crop"<sup>17</sup> or "to gather and store a crop".<sup>18</sup>

The agreed facts show that:

"Sugar cane is highly perishable, as will be hereinafter described, and starts to deteriorate immediately after harvesting. To avoid serious losses it must be processed into sugar, syrup or molasses within a few hours after it has been burned or severed from the ground. For this reason and because of the great weight and bulkiness of cane as compared with raw sugar, it must be processed within a few miles of where it is grown. Sugar cane never moves into interstate commerce in its natural state." (R. 33).

In view of these facts, we submit that the appellees' activities of hauling perishable sugar cane from the fields to the mill on appellant's narrow gauge railroad—

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<sup>17</sup> Webster's New International Dictionary, Unabridged Version, 2d Ed. 1945, p. 1142.

<sup>18</sup> Standard Dictionary, Funk and Wagnall, 1935 Ed.

all on the farm—were merely part of the gathering in of sugar crops. This Court itself drew an analogy between the hauling of the cane and processing it into a non-perishable product and threshing operations performed on wheat:

“The gathering of the cane and transporting it on the farm and reducing it to a product which can be handled without loss probably bears some analogies to other farming. In the old days of threshing operations in wheat with stationary threshers, the header cut the grain and it was carried by elevators into header boxes and by the header boxes carried to stacks. Thereafter the stationary thresher would move from one stack to the other and thresh out the grain and place it in sacks. If the farmer owned his own outfit and farmed his own land, it was all a part of the harvesting operation up to the point where the grain was in the bag” 178 F. (2d) at 610.

It is irrelevant, as this Court recognized, that the hauling of cane to the mill took place by railroad rather than by truck or some other medium. *Supra*, p. 20.

The district court denied that these hauling activities constituted “harvesting” on the ground that the gathering of the crop is completed in the fields where it is grown after it is loaded onto rail cars. 97 F. Supp. at p. 222. But this is as absurd as to assert that the cutting of stock feed in the fields completes the gathering in of such stock feed, even though it is then taken to storage in a silo on the farm.

No reason exists for drawing any distinction between that part of the hauling operation which takes place on the portable tracks which the district court held exempt (97 F. Supp. at 220; R. 194) and that part which takes place on the permanent tracks. Both are a part of the gathering in of the sugar crops. The portable tracks were used in the fields instead of the permanent tracks only because permanent tracks cannot be laid on account of the interference which would otherwise result in planting and cultivating operations (R. 60). During the

short periods when portable tracks were in use in the fields, they were an integral part of the railroad system over which cane cars moved directly from the fields to the mill (R. 60).

As we shall show below, *infra* pp. 32-33, the agriculture exemption specifically includes "preparation for market, delivery to storage or to market or to carriers for transportation for market". Such language clearly establishes that the terminal point of the agriculture exemption is not reached at least until the farmer has disposed of possession of his product. And if Congress intended the exemption to extend to the delivery of the product to market or to carriers as it expressly provided, obviously it intended that all operations which preceded such delivery should be exempt when performed by the farmer or on the farm as an indispensable incident to or in conjunction with the farming operations. Thus, if transportation required in the delivery of raw sugar to carriers for transportation to market was exempt, it would be meaningless to hold that transportation of cane to the mill (R. 205-206), which preceded even the preparation for market, was not exempt.<sup>19</sup>

The term "harvesting", we submit, likewise included the processing by appellees of the sugar cane grown by appellant. This Court so suggested in its earlier opinion herein:

"If it be that, to prevent deterioration, there must be direct and immediate delivery from the harvest field to the cane-cleaning plant for cleaning preparatory to crushing, the hauling might be placed upon the same basis as the other processes which are necessary to prepare agricultural products to prevent deteriora-

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<sup>19</sup> For the same reason it would be equally meaningless to hold non-exempt the hauling of supplies and laborers to or from the fields (R. 235-239, 248-256, 279-283) and the repair and maintenance of field implements (R. 191-204) and hauling equipment (R. 198-201, 206-212) necessary to the continued functioning of the field operations and of the operations involved in delivering the cane to the mill.

tion. Again, the threshing operation with wheat, which is only a first step, may furnish a guide. Everyone realizes that, in order to be used, the wheat must necessarily be elsewhere milled into flour. Likewise, everyone realizes that, before the sugar is usable, it must be refined at another factory. *The process of harvesting cane might end only with the bagging of the raw sugar, as the harvesting of wheat ends with the bagging of the grain*" 178 F. (2d) at 611. [Emphasis Supplied].<sup>20</sup>

2. *"And Any Practices . . . Performed by a Farmer or on a Farm as an Incident to or in Conjunction with Such Farming Operations, Including Preparation for Market, Delivery to Storage or to Market or to Carriers for Transportation to Market."*

We turn next to the second distinct meaning of the agriculture definition in Section 3(f). After exempting "farming in all its branches" the exemption goes on to include "and any practices . . . performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market". For the reasons which follow this part of the definition of "agriculture" also exempted the activities of appellees now in question.

a. APPELLANT WAS A FARMER.

Appellant was a farmer within the sense used in Section 3(f), since it conducted the farming operations enumerated in Section 3(f) of producing, cultivating, growing, and harvesting sugar cane.

b. APPELLEES' ACTIVITIES NOW IN QUESTION WERE PERFORMED ON A FARM.

As the Stipulation herein shows, the work of appellees of (a) producing sugar cane, (b) hauling such cane to the

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<sup>20</sup> It is material to observe at this point that the processing by a farmer of the sugar cane that he grows is and always has been a normal incident of sugar cane farming in Hawaii (R. 31, 84).



mill, (c) grinding such cane into raw sugar and molasses, (d) repairing and maintaining field implements or hauling and mill equipment, and (e) performing other incidental operations necessary and indispensable thereto, was performed on appellant's plantation, i.e., its farm, except in minor and sporadic instances.<sup>21</sup>

"Farm" is defined in Webster's New International Dictionary (2d ed.), Unabridged, (1945), p. 919 as

"... a piece of land held under lease for cultivation; hence, any tract of land (whether consisting of one or more parcels) devoted to agricultural purposes, generally under the management of a tenant or the owner; any parcel or group of parcels of land cultivated as a unit . . ."

Appellant's plantation meets this definition, for as the agreed facts show (R. 35-36):

"All the lands devoted to the growing of sugar cane are managed and operated by the Plantation as an integrated farming unit and single enterprise with identical cropping, cultivation and harvesting practices, and with the same labor and equipment. Employees work in the fields moving from one area to another depending upon the program of plowing, planting, irrigating, fertilizing, applying herbicides and insecticides, weeding and harvesting. The cane lands are in various stages of production or preparation. Some acreage is being plowed and furrowed for new planting, some is being "ratooned" (a process hereinafter described), some acreage is in young growth, some in old growth nearing maturity and other acreage is being harvested. The growing, harvesting and processing of the cane and the marketing of the raw sugar constitute one continuous and year around operation . . ."

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<sup>21</sup> For example, in some workweeks appellee Vierra hauled crushed rock from off the plantation to the plantation to be used in making concrete irrigation flumes for use in appellant's irrigation operations (e.g. Stip. pp. 108-110; workweeks Feb. 24-March 2, March 3-9, 10-16, 17-23, 1947). Since this work constituted the going off the farm to obtain supplies and equipment for the plantation, it was clearly exempt under Section 3(f).

The court below, however, stated:

"Portable track is laid on the *fields* where cane is grown; but the permanent main line transportation is not located on the *farm* in the same sense. True it is located on the plantation property, but the word 'plantation' refers simply to the geographical area of nearly ten thousand acres on which plaintiff conducts all its operations. Obviously cane is not grown on the right-of-way occupied by the fifty-six miles of permanent main line railroad track. Land is set aside exclusively for railroad purpose" [Emphasis Supplied] 97 F. Supp. at 222.

This statement, however, confuses the term "farm" (which may include a number of fields) with the term "field". As we have already shown, the words "on a farm" as used in Section 3(f) mean the land or other place under the ownership or control of the grower, where the growing operation and other operations enumerated in Section 3(f) take place. The term "farm" is not limited to those portions of a farm on which agricultural products actually grow. Thus the permanent rail tracks of appellant's narrow gauge railroad are not located in the cane fields, but they are located on the "farm", just as appellant's field roads are located on the "farm" (R. 64). Thousands of farms throughout the United States have field roads, as they also have barns, silos, wells and many other improvements, on the sites of which agricultural products do not actually grow. The term "farm" has never been used as excluding the locations of such field roads or of such barns, silos, wells and other improvements.

C. APPELLEES' ACTIVITIES IN QUESTION CONSTITUTED PRACTICES INCIDENT TO OR IN CONJUNCTION <sup>22</sup> WITH THE SUGAR CANE FARMING CONDUCTED BY APPELLANT ON ITS FARM.

All of such activities were integrated and coordinated with and a necessary and indispensable part of appellant's

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<sup>22</sup> The term "incident" is defined in Webster's Dictionary, *supra*, p. 1257, as meaning "appertaining to," "directly and immediately

operations of producing, cultivating, growing and harvesting sugar cane. (R. 35-36, 52, 67, 94; 97 F. Supp. at 204). Moreover, they were performed only upon or with respect to the cane which appellant grew on its own farm (R. 59, 84). Accordingly, such activities were exempt as being practices "incident to or in conjunction with" farming. *Farmers Reservoir Co. v. McComb*, 337 U.S. at 766, note 15.

To prevent spoilage and serious loss the cane had to be transported to the mill immediately after being burned or cut and there processed into raw sugar almost at once. (R. 33, 67). The most efficient and profitable operations called for shipment of the raw sugar to mainland refineries immediately upon production (R. 84). The myriad other activities in which appellees engaged, such as the furnishing of water and power used in connection with the growing and milling of cane (R. 45 *et seq.*, 85 *et seq.*, 216-220), were functionally necessary and indispensable for the conduct of the entire operations of appellant. Thus appellees engaged in the activities in question were engaged in practices "incident to or in conjunction with" farming.

The district court denied that these various activities were exempt as being incident to or in conjunction with appellant's operations and relied in part upon the fact that appellees, who engaged in such activities, were carried on appellant's payroll records for accounting and income tax purposes as attached to different departments than the employees who worked in the fields. 97 F. Supp. at 221, 223, 225. But this is irrelevant. The question of whether particular appellees were engaged in practices incident to or in conjunction with appellant's farming operations can be determined only by examining the actual operations of appellant and appellees, and not by examining the manner in which appellant maintained its bookkeeping records.

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pert. to, or involved in, something else". "Conjunction" is defined by Webster, p. 565, as "association," "occurrence together".

d. "PREPARATION FOR MARKET", AS APPLIED TO THE FACTS HERE, MEANS PROCESSING OF SUGAR CANE INTO RAW SUGAR.

One of the practices which the agriculture definition specifically exempts, when incident to or in conjunction with the farming operation, is "preparation for market". If the words "preparation for market" are to be given any meaning with respect to sugar cane farming, they plainly embraced the mill operations in which the appellee employees engaged (R. 310-317, 216-220). As already observed, because of the highly perishable nature and weight and bulkiness of sugar cane, it never moves in interstate commerce nor does it have any economic use as such. Rather it must be ground within a few hours after being harvested and therefore within a few miles of where it is grown, before moving in interstate commerce (R. 33). And appellant always processed its sugar cane into raw sugar or molasses before marketing it (R. 31, 33, 67). Clearly then the mill operation was "preparation [of sugar cane] for market". The statutory language likewise encompassed the necessary and incidental function of keeping the mill equipment in good repair (e.g. R. 310-317, 212-220, 223-226). See also R. 94.

The district court, however, held that the appellees engaged in the mill operation of appellant were not engaged in an operation which was a "subordinate" part of farming and therefore their work was not "incident" to appellant's farming operations and did not fall within the agriculture exemption. 97 F. Supp. 223. But the record shows that in terms of effort as represented by hours of labor and in terms of expense as represented by operating charges, appellant's mill operations were clearly subordinate to its cultivating, irrigation, harvesting, and other general field operations (R. 178). Moreover, assuming that appellant's mill operation was not so subordinate and therefore was not "incident" to appellant's "farming" operations, the argument overlooks the fact that the statutory definition of "agriculture" not only

embraces “practices . . . *incident* to . . . farming operations” but, as a separate and distinct category of exempt operations, it also embraces “practices . . . performed by a farmer or on a farm . . . *in conjunction with* . . . farming operations” [Emphasis supplied]. The phrase “in conjunction with” has no connotation of subordinacy. The mill operation was “in conjunction with” the field operations of appellant and as such was within the statutory exemption.

e. “DELIVERY TO STORAGE OR TO MARKET OR TO CARRIERS FOR TRANSPORTATION TO MARKET”.

These incidental and conjunctive practices, which the statute specifically lists, obviously embraced the delivery by appellees of raw sugar to the sugar warehouse for temporary storage and the appellees’ sugar shipping activities (R. 317-318).

**C. The Legislative History of Sections 13(a)(6) and 3(f) Also Shows That the Work of Appellees in Question Fell Within the Exemption.**

Assuming *arguendo* that interpretation of the statutory language is in doubt and requires resort to the legislative history to resolve any ambiguity,<sup>23</sup> that history emphatically underscores appellant’s interpretation of the dominant Congressional purpose.

1. *Senate proceedings.* S. 2475,<sup>24</sup> which ultimately became the Fair Labor Standards Act of 1938, was introduced in the Senate on May 24, 1937. As the bill was introduced, agricultural laborers were exempt but there was no definition of the term “agricultural laborer.”

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<sup>23</sup> *United States v. C.I.O.*, 335 U. S. 106, 112-113; *Addison v. Holly Hill Fruit Products*, 322 U. S. 607, 615, 617-618; *U. S. et al. v. American Trucking Associations, Inc.*, 310 U. S. 534, 547 *et seq.*

<sup>24</sup> The bill in its various forms—as introduced, as reported, etc.—referred to in this discussion of the legislative history will be found in “Senate Bills, 75th Cong. 1937-38, Vol. 13, 2401-2550—J-50-2d Set.”

The Senate Committee on Education and Labor, to which the bill was referred, rewrote the agricultural exemption and defined "agriculture" as including

"... farming in all its branches and among other things includes the cultivation and tillage of the soil, dairying, forestry, horticulture, market-gardening, and the cultivation and growing of fruits, vegetables, nuts, nursery products, ferns, flowers, bulbs, livestock, bees, and poultry, and further includes the definition contained in sub-division (g) of section 15 of the Agricultural Marketing Act, approved June 15, 1929, as amended, or any other agricultural or horticultural commodity, and *any practices ordinarily* performed by a farmer as an incident to such farming operations" [Emphasis supplied]. *S. 2475* as reported in the Senate July 6, 1937, Section 2, pp. 50-51.

The report accompanying the bill contained only a brief statement that there was excluded from the bill—

"persons engaged in agriculture and such processing of agricultural commodities as is ordinarily performed by farmers as an incident of farm operations" (*S. Rep. 884*, 75th Cong., 1st Sess., p. 6).

Senator Black, chairman of the Senate Committee in charge of the bill, in opening the Senate debate on the bill, stated that it—

*"specifically excludes workers in agriculture of all kinds and of all types. There is contained in the measure, perhaps, the most comprehensive definition of agriculture which has been included in any one legislative proposal"* [Emphasis supplied]. 81 Cong. Rec. 7648.

Appendix C herein, p. 113, *infra*, sets forth additional parts of Senator Black's statement.

In debate, Senator Pope asked if "dairying" would include "the farmer who bottles his own milk and cream and sells it" "even though he might do it in considerable quantity." Senator Black answered, "Unquestionably", and further, "I have no doubt that a dairy farmer who bottles his own milk is still a dairy farmer. The fact that

he bottles it would not change his characteristics from that of a farmer." 81 Cong. Rec. 7656.

Senator Copeland read a telegram from the International Apple Association urging that the agricultural exemption be amended to include "preparing for market, in their raw or natural state within the area of production, fresh fruits and vegetables, including packing, packaging, storing, transporting, and marketing of said commodities" *Id.*, p. 7656. Senator Black commented that the Committee was not in favor of exempting the packing business as it related to many agricultural products. But he significantly added: "*The farmer or the apple grower has a perfect right, of course, to pack his own apples either alone or in cooperation with his farming neighbors . . .*" [Emphasis supplied]. *Id.*, p. 7657.<sup>25</sup>

Senator Overton then asked Senator Black whether if a farmer has a large cotton plantation and gins his own cotton, the ginning operation is exempt. Senator Black said yes, that that would be a process in the agricultural handling of cotton and that the "bill does provide that *those things done with reference to commodities produced on the farm by the farmer on the farm are not included in the possible application of the Act*" [Emphasis supplied]. *Id.*, p. 7657.

Later in the debates, Senator Black, commenting upon a suggestion of Senator Schwellenbach that the line of distinction be made at the point of agricultural operation and that "when it becomes a processing operation, a canning operation, it ceases to be an agricultural operation," stated as follows: "Going into another phase of farming,

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<sup>25</sup> Senator Copeland later questioned Senator Black on the packing by a farmer of his own apples, his placing same in a storage house, and his subsequent transportation of the apples to market. Senator Black stated that such operations would be exempt. He drew an analogy between such operations and those of a farmer raising watermelons who packs his fruit in crates and then takes them to town to sell them either to a broker or from house to house. All such operations, he stated, would be exempt. 81 Cong. Rec. 7658. See also similar statements by Senator Schwellenbach (*Id.*, p. 7659) Appendix C herein, p. 113, *infra*.

let us take the man who raises hogs. *A great many farmers who raise hogs kill their hogs on their own farms . . . They prepare the hogs for market on their own farms, and then send out the product. As the bill is framed, there would be no possible manner in which their employees could be included under the provisions of the bill, because that would clearly be farming; . . .* [Emphasis supplied]. *Id.*, p. 7659.

The debate went further and specifically addressed itself to the processing of sugar cane. Senator Overton inquired whether a sugar plantation with a mill at which it processed its own cane into sugar would be exempt. Senator Black replied that it would depend upon whether such processing was *ordinarily* performed by a farmer upon his crop. *Id.*, pp. 7657-7658. See Appendix C herein, pp. 113-116, *infra*. Since the word "*ordinarily*" was later stricken from the exemption before the bill was enacted, it is obvious that the grinding by a farmer of his own cane was intended to be within the exemption whether or not "*ordinarily*" a farmer does such grinding. In any event, cane grinding is "*ordinarily*" performed on its own plantation by the appellant itself on the cane that it grows, following the usual practice in Hawaii. *Supra*, p. 6. See also footnote 20, p. 28, *supra*.

As for exemption of operations and facilities functionally necessary and indispensable to the growing and processing of sugar cane and to the shipment of raw sugar so processed, such as the hauling of cane from the fields to the processing plant and the repair of field, hauling, and processing equipment, this too was not left in any doubt. On July 30, 1937, Senator McGill introduced an amendment (*Id.*, p. 7888) to provide that the agricultural exemption should apply not only to practices ordinarily performed *by a farmer* as an incident to his farming operations, but also to practices performed *on a farm* as an incident to such farming operations. His amendment further provided that following the words "any practices ordinarily performed by a farmer or on a farm as an



incident to such farming operations," there be added the words "including delivery to market."

Senator McGill stated that the purpose of his amendment was to exempt all kinds of work done on a farm so long as it was incidental to agricultural purposes and was merely preparatory to the marketing of the field crop and that the amendment would also include all kinds of labor performed in connection with making delivery to market of agricultural products. *Id.*, pp. 7888, 7927, 7928. The amendment was adopted. *Id.*, p. 7888. The discussion on the McGill amendment and also on a related amendment introduced and then withdrawn by Senator McAdoo appears in Appendix C herein, pp. 116-119, *infra*.

The bill as passed by the Senate on July 31, 1937 defined "agriculture" in relevant part as including

"... any practices *ordinarily performed* by a farmer or on a farm as an incident to such farming operations, *including delivery to market*" [Emphasis supplied].

2. *House proceedings.* The bill was thereupon referred to the House Committee on Labor. As reported by such Committee on August 6, 1937 "agriculture", insofar as relevant here, was defined as including

"... any practices performed by a farmer or on a farm as an incident to such farming operations, *including delivery to market*..." [Emphasis supplied]. *H. Rep. 1452*, 75th Cong., 1st Sess., pp. 4-5.

The bill as reported by the House Committee thus struck "ordinarily" from the definition of agriculture, so that the definition included *any practices* performed by a farmer or on a farm as an incident to farming operations, without qualifications. The Committee report made specific reference to the fact that it had stricken the word "ordinarily", thus showing that such action was not inadvertent. *Id.*, p. 11. And the definition as ultimately enacted did not contain the word "ordinarily" or any similar limitation.

The Rules Committee of the House refused to grant a rule, but on December 13, 1937, that Committee was discharged from further consideration of the bill by petition of the House membership. However, on December 17, 1937, the bill was recommitted to the Labor Committee. At that time, insofar as relevant, "agriculture" was still defined as when the bill was reported on August 6, 1937.

On April 21, 1938, another draft of S. 2475 was reported to the House. As reported the definition of "agriculture" was again broadened, and, insofar as relevant, read as follows:

"'Agriculture' includes . . . *any practices performed by a farmer or on a farm as an incident to such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market*" [Emphasis supplied]. *H. Rep. 2182*, 75th Cong., 3d. Sess., p. 2.

This definition added the phrases: "preparation for market,"<sup>26</sup> delivery to storage . . . or to carriers for transportation to market." The bill passed the House on May 24, 1938 in this form.

3. *Conference Report and debates thereon.* The Conference Report not only retained every single amendment that had broadened the definition of "agriculture," but it made that definition still more inclusive by exempting all practices performed by a farmer or on a farm "*in conjunction with such farming operations.*" 83 Cong. Rec. 9253-9254. Thus Congress was even unwilling to restrict the definition to practices that were *incident* to farming operations, but made explicit its intent that the exemption should apply as well to practices *in conjunction with farming operations.*

In Senate debate on the Conference Report, Senator Elbert D. Thomas, who had succeeded Senator Black as

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<sup>26</sup> Unlike similar language in Section 13(a)(10), this is not limited by the requirement that the preparation for market of the agricultural commodities be of the commodities in their raw or natural state. Hence, any preparation for market by the farmer or on a farm is exempt even if in such preparation the raw or natural state of the commodities is changed.

chairman of the Senate Committee on Education and Labor, and was chairman of the Senate conferees, stated that the agricultural exemption was purposely all-inclusive. 83 Cong. Rec. 9162-9163. See Appendix C, herein, p. 119, *infra*.

4. *Conclusion.* The legislative history shows that Congress started with a very broad, comprehensive definition of agriculture, and that such definition at every stage of its consideration by one or the other of the houses of Congress, as the bill worked its way through to passage, was made more and more all-inclusive. Practices "performed . . . on a farm" as an incident to farming operations were added to the original definition, which was intended to include such highly mechanized or industrialized operations as milk bottling, cane sugar grinding, fruit packing, cotton ginning and hog slaughtering, and all without qualification as to whether they were "ordinarily" performed by the farmer or on the farm. Also exempted were "preparation for market," "delivery to . . . market," "delivery to storage," "delivery to . . . carriers for transportation to market," and finally, practices "performed . . . in conjunction with" farming operations.

No distinction was drawn by Congress as between "large" or "small" farms or between "hand labor" or "mechanized" farms. Congress granted a sweeping exemption to *all* "agriculture," regardless of the mechanized character of the operations in order not to impose upon *any* agriculture the costs and other obligations imposed upon industry. Without the broad definition of "agriculture" which was written into the bill, it is a reasonable conclusion from the legislative history that the bill could not have been enacted into law (83 Cong. Rec. 7393, 9257).

**D. The Decided Cases Also Show That the Work of the Appellees in Question Was Exempt Under the Agriculture Exemption.**

*Farmers Reservoir & Irrigation Co. v. McComb*, 337 U.S. 755, is the only case involving the agriculture exemp-

tion which has been considered by the United States Supreme Court. In that case the Supreme Court held that the employees of a farmers' mutual irrigation company were not within the agriculture exemption. The irrigation company owned four large and several small reservoirs and a system of canals from 200 to 300 miles long. Its sole activity was the collection, storage and distribution of water for irrigation purposes to its own stockholders, all of whom were farmers. However, the irrigation company was not a farmer because it did not grow anything and none of its activities was performed on a farm. The Supreme Court found that such activities, as conducted by a mutual irrigation company, were not farming and also did not constitute practices performed by a farmer or on a farm as an incident to or in conjunction with farming operations.

The opinion in the *Farmers Reservoir* case makes it clear that if irrigation activities are conducted by a farmer, for the benefit of his farm, the employees engaged in such irrigation activities are within the agriculture exemption. 337 U.S. at p. 761-762. The opinion also makes it clear that if transportation and processing activities are conducted by a farmer, with respect only to commodities produced by that farmer, the farmer's employees engaged in such activities are within the agriculture exemption, such activities being incident to or in conjunction with the farming activities of the farmer. 337 U.S. at p. 766, note 15. However, where a farmer transports or processes on his farm the commodities produced by another farmer, such activities are not within the agriculture exemption because they are not performed by the farmer as an incident to or in conjunction with his own farming operations. This matter is important in the instant case, because appellant does not transport or process any sugar cane except that grown by it on its own plantation (R. 59, 84).

The district court, in narrowly delimiting the exemption, placed great reliance upon three decisions of the United States Court of Appeals for the First Circuit, all of which involved sugar operations in Puerto Rico. 97 F.

Supp. at 220-221. Two of these decisions, namely, *Calaf v. Gonzalez*, 127 F. (2d) 934, and *Bowie v. Gonzalez*, 117 F. (2d) 11, 123 F. (2d) 387, were specifically held by this Court to be inapplicable to the facts here. 178 F. (2d) at 611. This Court ruled that the explanation of the decisions in these two Puerto Rico cases is the same as the explanation of the *Farmers Reservoir* case, and stated:

“The question as to the classification of workers who have to do with irrigation has recently been dealt with by the Supreme Court of the United States in *Farmers Reservoir & Irrigation Co. v. McComb, Adm.*, 337 U.S. 755, 69 S.Ct. 1274. There it was held that an irrigation system common to a great many farms which hired its own employees was under the provisions of the Fair Labor Standards Act and was not covered under the agricultural exception. But the Court there pointed out that in the particular case there was not an operation by a farmer or on a farm, but that it was a communal enterprise by several farms. The explanation for this case is the same as that of *Calaf v. Gonzalez*, 1 Cir., 127 F. 2d 934; *Bowie v. Gonzalez*, 1 Cir., 117 F. 2d 11; *Gonzalez v. Bowie*, 1 Cir., 123 F. 2d 387, and the opinion of this Court in *North Whittier Heights Citrus Ass’n v. National Labor Relations Board*, 9 Cir., 109 F. 2d 76.” 178 F. (2d) at 611.

It should be noted that at the same time this Court expressed the view that it was the “desire [of Congress] to exempt processing as a part of the harvesting done by a farmer or on a farm”. 178 F. (2d) at 609.

The other Puerto Rican sugar case, upon which the district court relied, namely *Vives v. Serralles*, 145 F. (2d) 552 (C.C.A. 1), supports appellant’s contention. That case dealt with the status under the agriculture exemption of cane transportation employees who worked solely on farms. The employer grew sugar cane on several separate farms. On one of the farms the employer operated a mill where the sugar cane was processed. The employer also owned and operated a railroad which was used in the transportation of sugar cane from the outlying farms

to the mill. The railroad was not used to transport sugar cane grown on the farm where the mill was located. The case involved two groups of employees: (1) employees on the outlying farms who transported the sugar cane, after it was cut, to concentration points where railroad sidings were maintained; (2) employees on the farm where the mill was located, who transported sugar cane, after it was cut, to the mill. The transportation above referred to was in railroad cars pulled by oxen over portable tracks, in ox-carts, or in steel cars pulled by tractors.

The court held that both groups of employees were within the agriculture exemption. The court pointed out that the situs of the activities of both groups of employees was on the farm and that the transportation operations were really part of harvesting. The significance of the holding, to the instant case, has to do with the second group of employees, who worked on the farm where the mill was located and who transported the sugar cane, after it was cut, to the mill on that farm. In this respect their activities were identical with the activities of the sugar cane transportation employees in the instant case. For reasons which have already been given, no distinction can be made based on differences in the types of vehicles used in the transportation or in the extent of mechanization of the transportation operation.

Thus, the proper interpretation of the Puerto Rico sugar cases is that they hold that transportation employees and processing employees are within the agriculture exemption when they are transporting or processing sugar cane grown by their employer, but that they are not within the exemption when they are transporting or processing sugar cane grown by others than their employer. Not only has this Court so interpreted such cases, *supra* p. 41, but the United States Supreme Court and the First Circuit itself have so interpreted them, as will be more fully shown below.

*Supreme Court:* In *Farmers Reservoir & Irrigation Co. v. McComb*, 337 U. S. at 766, note 15, the Supreme Court

referred to the first of the Puerto Rico sugar cases and stated:

“Although not relevant here, there is the additional requirement that the practices be incidental to ‘such’ farming. Thus processing, on a farm, of commodities produced by other farmers is incidental to or in conjunction with the farming operation of the other farmers and not incidental to or in conjunction with the farming operation of the farmer on whose premises the processing is done. Such processing is, therefore, not within the definition of agriculture. *Bowie v. Gonzalez*, 1 Cir., 1941, 117 F. 2d 11.”

The inference is plain, that the processing on a farm of commodities produced solely by the farmer comes within the exemption. Furthermore, the reference to the *Bowie* case indicates the intent of the Supreme Court that the rule would apply to the processing of sugar cane. Similarly, if the rule applies to processing it must apply to pre-processing transportation to the mill.

*First Circuit:* The Court of Appeals for the First Circuit has also held that the decisions in the *Farmers Reservoir* case and the decisions in the Puerto Rico sugar cases reflect the same rule of law. In so doing the court necessarily held that the governing factor in such cases was whether the activities of the employees were solely incidental to or in conjunction with the farming operations of their employer or were incidental to or in conjunction with the farming operations of other farmers. This holding appears in the decision in *Puerto Rico Tobacco Marketing Coop. Association v. McComb*, 181 F(2d) 697, wherein it was determined that the employees of a tobacco marketing cooperative association, which engaged in warehouse and fermenting and stemming operations for the benefit of its members, were not within the agriculture exemption. The court stated:

“The *Farmers Reservoir & Irrigation Co.* case is squarely in point in all material respects and rules the case at bar so far as §13(a)(6) is concerned. Indeed the language of the Supreme Court in that

case is directly applicable, *mutatis mutandis*, to the case at bar. See also to the same effect the decisions of this court in *Bowie v. Gonzalez*, 117 F.2d 11; *Calaf v. Gonzalez*, 127 F.2d 934; *Vives v. Serralles*, 145 F.2d 552, and *McComb v. Super-A Fertilizer Works*, 165 F. 2d 824.” 181 F (2d) at 701.<sup>27</sup>

It thus appears that the Supreme Court, this Court, and also the Court of Appeals for the First Circuit itself, have all interpreted the decisions of the latter court in the Puerto Rico sugar cases as being based on the distinction between the performance by a farmer of transportation and processing activities relating to his own products and the performance by him of such activities relating to the products of other farmers.

The district court relied on the decision of this Court in *North Whittier Heights Citrus Association v. N.L.R.B.*, 109 F. (2d) 76, which involved the employees of a cooperative processing and marketing association. 97 F. Supp. at 223. This Court, in its prior decision in the instant case, however, rejected the rationale of the *North Whittier Heights Citrus Association* case as having any application here because it was similar to the rationale of the *Farmers Reservoir* case and of the Puerto Rico sugar cases. 178 F. (2d) at 611.

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<sup>27</sup> The district court for the District of Puerto Rico has interpreted the decisions of the First Circuit in the same way. This appears from the fact that in *Bruno v. Hills Brothers Co.*, 7 Labor Cases, paragraph 61763 (D. Puerto Rico 1943), decided after the decisions in the *Bowie* and *Calaf* cases, the district court of Puerto Rico held that employees engaged in canning and packing grapefruit and curing citron raised by their employer on its farms were within the agriculture exemption.



**II. THE APPELLEES WERE ALSO EXEMPT FROM THE OVERTIME PROVISIONS OF THE ACT UNDER SECTION 7(c) WHEN THEY WERE ENGAGED IN ANY OF THE FOLLOWING DURING THE PERIOD COVERED BY THE LITIGATION:**

**(a) HAULING OF SUGAR CANE PRODUCED BY APPELLANT FROM THE FIELDS TO THE MILL AND REPAIRING, MAINTAINING, AND SERVICING EQUIPMENT AND FACILITIES USED IN SUCH HAULING;**

**(b) GRINDING SUCH SUGAR CANE AT THE MILL INTO RAW SUGAR AND MOLASSES, AND REPAIRING, MAINTAINING, AND SERVICING THE MILL AND ITS EQUIPMENT;**

**(c) TEMPORARILY STORING, LOADING, AND SHIPPING SUCH RAW SUGAR AND MOLASSES, AND**

**(d) SUCH OTHER INCIDENTAL OPERATIONS AS WERE NECESSARY AND INDISPENSABLE TO THE FOREGOING.**

The district court confined the Section 7(c) processing exemption to those appellees who worked in the mill building, and who were (a) operating machinery which processed sugar cane into raw sugar or (b) bagging, loading and shipping such raw sugar. (R. 310-318; 97 F. Supp. at 222-223.)

We submit that the district court's holding as to Section 7(c) is erroneous and that in fact appellees were exempt under that section when engaged in any of the activities listed in the heading above. This is a material contention only if the Court should be of the view that the Section 13(a)(6) exemption did not apply to exempt all the appellees when they were engaged in such activities, as we have contended in Part I of our Argument. In that case we submit that the appellees not found exempt from overtime requirements under Section 13(a)

(6) were necessarily exempt under Section 7(c). As this Court pointed out in its earlier decision herein:

“As to sugar, the *all-year processing* exclusion, in addition to the broad *agricultural* exclusion, indicates strongly congressional intent. *Not only was it the desire to exempt processing as a part of the harvesting done by a farmer or on a farm, but also processing done by a third party.* These provisions are not alternative or mutually exclusive, and should be liberally construed for the reasons given by this Court in *McComb v. Hunt Foods, Inc.*, 9 Cir., 167 F. 2d 905, 908” [Emphasis Supplied]. 178 F. (2d) at 609.

The district court, we submit, gave the Section 7(c) exemption a hyper-technical and formalistic construction, contrary to the holding of this Court in *McComb v. Hunt Foods*, 167 F. (2d) 905, 906. As stated in that case the purpose of Section 7(c) was to relieve certain processors of seasonal or perishable agricultural commodities from the burden of paying overtime. *Id.* pp. 906-907. But under the holding of the district court herein, appellant—a processor of a perishable agricultural commodity—would not be so relieved, because exemption under Section 7(c) would be denied many appellees engaged in activities necessary and indispensable to appellant’s sugar cane processing operations.

#### **A. The Language of Section 7(c) Exempted the Appellees When They Were Engaged in Any of the Activities in Question.**

The language of Section 7(c), insofar as relevant, exempts without limit as to period of time all employees in “any place of employment” where their employer is “engaged . . . in the processing of . . . sugar cane . . . into sugar (but not refined sugar) or into syrup”. Thus, to fall within the exemption it is sufficient to show that (a) the *employer* is engaged “in the processing of . . . sugar cane . . . into sugar (but not refined sugar) or into syrup” and that (b) the work of the *employees* takes place in the “place of employment” where their employer

is “engaged . . . in the processing of . . . sugar cane”. [Emphasis supplied]. We submit that both factors were present here.

1. *Appellant Was Engaged “in the Processing of . . . Sugar Cane . . . Into Sugar (But Not Refined Sugar) or Into Syrup”.*

Appellant was engaged in just two things: (a) producing sugar cane and (b) processing same into raw sugar and molasses.<sup>28</sup> Insofar as appellees engaged in the activities in question are held not to have been engaged in producing sugar cane and hence not exempt under Section 13(a)(6), they must be held to have been engaged in processing cane into raw sugar or in activities necessary and indispensable thereto, and therefore exempt under Section 7(c). This includes appellees engaged in hauling sugar cane from the fields to the mill, repairing the hauling and processing facilities and equipment, or performing incidental operations necessary and indispensable to such hauling, processing or repair work, such as the hauling or storage of supplies, materials and equipment, or laboratory and office work.

The processing activity in which appellees were engaged was not limited to the mere operation of automatic machinery which ground the cane and extracted its juices. “Processing” included the numerous activities which were necessary and indispensable to the processing of the sugar cane, such as the production of steam and power for use in performing the processing operations, the repair and maintenance of the mill and its equipment, the storage of supplies for the mill, laboratory work for the mill, and the hauling of raw materials, i.e., the sugar cane to the mill. When the appellees were engaged in such activities (e.g., R. 85-86, 90, 205-206, 212-220, 223-226, 227-231, 243-248, 266-273, 286-288, 318-319), they were performing work just as indispensable and as much re-

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<sup>28</sup> The incidental activities of appellant with respect to its plantation villages are discussed in Part III of our Argument, *infra*, pp. 57-74.

lated to sugar cane processing, as when they watched gauges in the boiling house or otherwise operated the processing machinery (R. 310-317). The employee appellees were engaged in processing, whether keeping the machines in repair at the adjoining machine shop (R. 243-248) or repairing the machines during breakdowns at the mill (R. 95, 96, 101, 102) with the operating staff of appellant standing by waiting for repairs to be completed. All the repair work, wherever and whenever done, was an indispensable requisite to the continued and effective operation of the processing facilities (R. 94 *et seq.*).

2. *The Appellees Worked in the "Place of Employment Where He [the Appellant] [Was] So Engaged" in the Processing of Sugar Cane.*

The term "place of employment" as used in Section 7(c) has always been held to include the roads and railways over which raw materials are transported to the processing plant and finished products away from it, as well as to include the several separate buildings in which the processing operation and other incidental operations necessary and indispensable thereto are carried on, if in fact the employer conducts such operations in several buildings. See cases and administrative interpretations discussed *infra*, pp. 49-54. The term "place of employment" cannot mean simply a single building, when the operation, of practical necessity, requires more than one building, but it must embrace the entire premises on which are located all the buildings required in the "processing of . . . sugar cane . . . into sugar". If, as the court below held (97 F. Supp. at 222, 225), Congress intended to limit the exemption to those working in the mill building or establishment, it could easily have selected apt words thus to indicate its purpose, as it did in other sections of the statute.<sup>29</sup>

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<sup>29</sup> Compare Section 12 and Section 13(a)(2) of the Act, where Congress used the more limited term "establishment".

Thus, the appellees engaged in hauling sugar cane from the fields to the mill were working in the "place of employment" where the appellant was engaged "in the processing of . . . sugar cane". And similarly the other appellees under consideration, such as those who repaired the hauling and processing facilities, stored the appellant's supplies, or did laboratory or office work, were working in such "place of employment". The buildings in which they worked, including the mill, service shops, storage places for appellant's supplies, and other buildings, were located in a small, compact and contiguous area of the plantation (R. 38, 721, 723), as all repair, laboratory, warehouse and shipping activities of appellant took place within 300 feet of the mill building proper (R. 94 and 723).

**B. The Decided Cases Further Show That in Performing the Activities in Question the Appellees Were Exempt Under Section 7(c).**

The decided cases recognize that Section 7(c) grants two types of exemptions. One type, e.g., handling, slaughtering and dressing of poultry or livestock, is limited to particular operations in an industry. The second type—and the processing of sugar cane into raw sugar is one of that type—extends to the entire industry.

The cases make it clear that when the particular exemption involved is one that refers to an entire industry, the exemption applies to all operations which are necessary and indispensable to that industry even though performed in several separate buildings. *Heaburg v. Independent Oil Mill, Inc.*, 46 F. Supp. 751 (W.D. Tenn. 1942) (exemption for processing cotton seed held to apply to all employees of a cottonseed mill, including watchmen, clerical employees, and employees handling and selling bagging and ties, most of which was used to wrap and bind lint cotton—a by-product of the mill's business—, but some of which was sold to cotton ginners); *Abram v. San Joaquin Cotton Oil Co.*, 49 F. Supp. 393 (S.D.

Calif. 1943) (exemption for processing cottonseed held to apply to employees working in several buildings and structures, including a seed storage house, mill, cleaning house, oil tanks, laboratory, and others, and engaged in laboratory work of analyzing crude cottonseed oil, including some oil from other plants, cleaning the oil, loading oil into tank cars, hauling trash, doing general work, janitorial work, and unloading cottonseed received at the mill).

So here the exemption applied to the work of the appellees in hauling cane from the fields to the mill, processing cane into raw sugar and molasses, repairing the hauling and processing facilities and equipment and performing the operations necessary and incidental thereto, notwithstanding some of such work was not performed in the mill building. All such work was necessary and indispensable to the processing by appellant of sugar cane into raw sugar and molasses.<sup>30</sup>

The Puerto Rico cases referred to *supra*, pp. 40-41, held that cane transportation is "incident to milling,"<sup>31</sup>

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<sup>30</sup> Other cases, dealing with various exemptions in Section 7(c), also fully support our contention that the exemption applies to all the operations of appellees in question. See *Byus v. Traders Compress Co.*, 59 F. Supp. 18 (W.D. Okla. 1942) (Section 7(c) year around exemption for compressing cotton held applicable to pressers, truck drivers, and handy-men); *Walling v. McCracken County Peach Growers Ass'n.*, 50 F. Supp. 900 (W.D. Ky. 1943) (Section 7(c) exemption for fruit packing industry held applicable to all employees of a fruit packing cooperative, including those who placed lids on the baskets in which the fruit was packed, those who labeled and stamped the baskets, clerical and supervisory employees, timekeepers, mechanics and watchmen); *McDaniel v. Clavin* (Calif. App. Ct.), 128 P. (2d) 821, aff'd, 22 Calif. (2d) 61, 136 P. (2d) 559 (1943) (Section 7(c) 14 workweeks exemption per year for handling, slaughtering and dressing poultry held applicable to an employee picking up poultry at warehouses and delivering same to defendant's poultry plant, making deliveries to defendant's customers, opening cases of frozen poultry, dressing poultry, cleaning the premises, etc.).

<sup>31</sup> These cases also held that employees engaged in the transportation by a farmer of his own sugar cane to his mill are within the agriculture exemption, *supra* pp. 40 *et seq.*

and in those cases it was assumed that such transportation was exempt under Section 7(c). See *Calaf v. Gonzalez*, 127 F. (2d) 934, 936-937 (C.C.A. 1). These cases involved transportation employees who did no work at the mill. In *Bowie v. Gonzales*, 117 F. (2d) 11, such employees included those engaged in repairing and maintaining the transportation facilities. And in *Calaf v. Gonzalez*, 127 F. (2d) 934, the employees who were held to be engaged in work "incident to milling" included those who did the following types of work: construction and repair of rolling stock, fireman, locomotive brakeman, splitting wood for engines, repairing main railroad line, signalling at grade crossings, and repairing railroad carts. If Puerto Rico employees engaged in such work were exempt under Section 7(c), so were the cane transportation employees in the instant case (R. 205-212).<sup>32</sup>

In denying exemption under Section 7(c) to appellees engaged in repair work, the district court cited cases (97 F. Supp. at 226), in most of which the employer involved was performing not only the operations described in the exemption language of Section 7(c), but also other operations not so described. For example, in *Walling v. Bridgeman-Russell*, (D. Minn. 1942) 6 Labor Cases ¶ 61,422, the employer at his place of business not only was engaged in the first processing of milk and cream into dairy products, but he was also wholesaling eggs, fountain supplies, frosted foods, meats and other commodities and he was making ice cream mix and ice cream. Furthermore, he was cutting, printing and packaging butter made in other places of employment. In *Fleming v. Swift*, 41 F. Supp. 825 (N.D. Ill. 1941) the employer not only was handling, slaughtering and dressing livestock, but he was also engaged in meat-curing, sausage-making, and manufacture of dog food, soap, glue and industrial

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<sup>32</sup> The denial by the district court of the processing exemption as to these employees was despite the fact that in denying the agriculture exemption to the same employees, the district court cited the holdings in the Puerto Rico cases that cane transportation is incident to milling.

oils. Accordingly, the exemption in those cases was limited to those departments of the employer's business engaged in the operations described in Section 7(c).<sup>33</sup>

In the case at bar, however, aside from the growing of cane, the appellant is engaged exclusively in an operation which 7(c) exempts, namely the processing of sugar cane into raw sugar. The Administrator also has recognized that this distinction exists in the Section 7(c) exemptions and that under the circumstances where an employer is engaged exclusively in an operation which 7(c) exempts, the exemption applies to all activities functionally necessary and indispensable to the exempt operation. See opinion of Administrator set forth in *Appendix D*, p. 120, *infra*, and also pp. 121-122, *infra*.<sup>34</sup>

**C. The Administrative Interpretations of Section 7(c) Also Show That in Performing the Activities in Question the Appellees Were Exempt Under Section 7(c).**

The Administrator stated in Interpretative Bulletin No. 14 (3 CCH Labor Law Reporter, ¶24,488) that Section 7(c) grants a "complete" exemption from the overtime provisions of the Act to employees "in any place

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<sup>33</sup> *Walling v. DeSoto Creamery & Produce*, 51 F. Supp. 938 (D. Minn. 1943) and *Shain v. Armour*, 50 F. Supp., 907 (W.D. Ky. 1943), also cited by the district court, are similar, although it should be noted that in the latter case, which involved both the Section 7(c) dairy products exemption and the Section 7(c) exemption for handling, slaughtering and dressing poultry, the dairy products exemption was held applicable to employees transporting cream to the plant. 50 F. Supp. at 913.

<sup>34</sup> The district court also cited *McComb v. Del Valle*, 80 F. Supp., 945 (D. Puerto Rico 1948) in support of its position that the Section 7(c) exemption did not apply to appellees engaged in repair work. 97 F. Supp. at 226. But that case did not involve any repair employees but involved only employees engaged in the storage, loading, and shipment of raw sugar and molasses—operations which the court below held exempt under Section 7(c). 97 F. Supp. at 222, 223; R. 317-318. And since in the *Del Valle* case the Section 7(c) exemption was held to apply to employees storing raw sugar in warehouses located as far as 400 feet from the mill building proper, it shows that exemption is not defeated for appellees doing repair work even though they worked in structures located up to 300 feet from the mill building.



of employment" where their employer is engaged in the processing of sugar cane into raw sugar. ¶¶ 14, 18.

Paragraph 22 of the Bulletin pointed out that the various exemptions provided by Section 7(c) are inapplicable to employees outside the "place of employment," but in this connection the Administrator stated that a "place of employment", although constituting only one establishment, *may contain several buildings in which the exempt operations are performed*" [Emphasis supplied]. Par. 22 further stated that "... truck drivers who carry raw materials to the establishment or who transport goods upon which the exempt operation has been performed may be considered as working in the 'place of employment' . . ."

Paragraphs 18 and 22 of the Bulletin are set forth in relevant part in Appendix D herein, pp. 120-121, *infra*.

The Administrator has repeatedly recognized that the Section 7(c) exemptions apply to employees engaged in transporting raw materials to the plant and finished products away from it. Necessarily then he has held such employees to be working in the "place of employment," and he has so declared with respect to employees of a sugar mill. WHM 35:769. The Administrator has gone further and declared that the handling, labeling and casing operations in a cannery storage place may be considered as performed in the same place of employment as the canning operation if (a) the storage place where such operations are performed is *in the same county* as the cannery building or *in a contiguous county*, (b) the canned fresh fruits or vegetables are taken directly to the storage place from the cannery building without intermediate storage at any other place, and (c) the operations are performed by employees of the canner who work interchangeably at the cannery and storage place or whose performance of the work is directed from the cannery in the same manner as if they performed it in a storage place located within the cannery. WHM 35:555. The Wage-Hour Division has also ruled that the removal of beet pulp residue from a sugar beet mill was a necessary incident to the production of sugar and hence within

the Section 7(c) exemption for the processing of sugar beets into sugar or syrup. WHM 35:771.

*A fortiori*, the various appellees here involved, including those engaged in burning cane residue, i.e. bagasse, as fuel for the production of power for use in performing the various processing operations, came squarely within the categories of employees whom Section 7(c) exempts. They either actually performed the sugar cane processing operation or their occupations were a necessary incident to the cane processing operation. All of them worked under the direction of the plantation manager (R. 37-38) on premises devoted by the appellant to the cane processing operation.

Appendix D herein, pp. 121-123, *infra*, sets forth more extensively a number of other interpretations of the Administrator in conformity with the above.

**D. The Exemption Provided in Section 7(c) Was Not Lost When the Appellees Performed Repair and Reconditioning Work on the Mill and Its Equipment During the Off-Season.**

The undisputed facts, agreed to by the parties, show that because of the slight variation in climatic and weather conditions from month to month, *sugar cane is grown the year around in the Territory and can be harvested and milled any month in the year—and frequently is*. Solely for efficiency of operations, sugar mills of the Territory must be closed down annually for extensive and general repair and reconditioning because of the heavy wear and tear on mill machinery and equipment. That part of the year when the mill is shut down for repairs is termed the “off-season”. (R. 109-110). If these repairs were not done annually, operating shutdowns would be frequent and excessive losses would be incurred. (R. 112). The appellant’s off-season averages three months per year (R. 111), but during the period covered by this litigation it ran only some seven weeks. 97 F. Supp. at 208. During the off-season there are no harvesting, ratooning, cane transportation or cane proc-

essing operations. All field operations other than harvesting, ratooning and cane transportation continue throughout the year (R. 111). Most of the off-season repair work is done by the men who operate the mill during the grinding season (R. 112).

We submit that, contrary to the holding of the court below (97 F. Supp. at 224-225), the Section 7(c) exemption must be regarded as applicable to repair work and all other work incidental and functionally necessary and indispensable to the processing of sugar cane into raw sugar, the year around and not only during the grinding season.

The literal language of the Section 7(c) exemption shows that it was intended to apply the year around and not only during the period of the year when the mill is operating. Unlike many other exemptions granted by Section 7(c), which are seasonal exemptions limited to fourteen workweeks in a calendar year, the exemption granted the processing of sugar cane is a year-around one without limitation. This Court emphasized this fact in referring to this exemption as an "all-year processing exclusion". 178 F. (2d) at 609. And the appellant operated its mill the year-round except insofar as such operations were required to be shut for annual repairs (R. 35-36, 52, 109-110, 111).<sup>35</sup> In fact, Hawaii is the only place in the United States which has year-around sugar production. In all other places the operating season is only 5 or 6 months per year.<sup>36</sup> It must be assumed, therefore, that Congress had Hawaii in mind when it granted a year-around exemption in Section 7(c) to sugar cane processing. And since Congress did not limit the ex-

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<sup>35</sup> The court below found that the purpose of the off-season operation was to preserve and enhance appellant's capital investment (97 F. Supp. at 224), but this finding is completely at variance with the stipulated facts which show plainly that appellant's off-season repair work was designed simply to insure the efficient operation of the mill (R. 109 *et seq.*)

<sup>36</sup> *Bowie v. Gonzalez*, 117 F. (2d) 11, 14 (Puerto Rico); WHM 40:151-152 (Louisiana); WHM 40:159-160 (Florida); WHM 40:131 (beet sugar industry).

emption to the period of the year when the mill is in operation, the exemption should not be construed as so limited.

Furthermore, Section 7(c) grants exemption to an employer with respect to his employees "in any place of employment" where the employer is engaged in processing sugar cane into sugar or syrup. So long as the "place of employment" is one where the employer processes sugar cane into raw sugar as the appellant did here, the exemption applies. There is no basis for disqualifying off-season work, which also takes place in the prescribed "place of employment" and which is required to permit the mill to continue operating.<sup>37</sup>

A controversy exists with respect to this issue, notwithstanding that appellant paid overtime after 40 hours of work in a workweek during the off-season to appellees working in the mill and also to certain repair shop appellees (R. 37). A declaratory judgment suit will lie to resolve this controversy. *Sunshine Mining Co. v. Carver*, 34 F. Supp. 274 (D. Idaho 1940).

Finally, the position of the district court cannot be reconciled with its holding that the exemption is applicable to appellees when they did repair work on the mill and its equipment during the week-end shutdown of the mill. 97 F. Supp. at 223-224.<sup>38</sup> Contrary to the district

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<sup>37</sup> Clearly distinguishable is *Maisonet v. Central Coloso* (D.P.R. 1942), 6 Labor Cases, par. 61,337, relied upon by the court below (97 F. Supp. at 225), where the court held the exemption inapplicable to a sugar processing mill in Puerto Rico during the off-season, in a case where the operating season was only six months long. The operation of sugar mills in Puerto Rico is seasonal (footnote 36, *supra*), the shutdown being caused because sugar cane is grown there for only part of the year. This differs completely from the case in Hawaii, where the grinding season is limited only by the needs of mill maintenance. Furthermore, unlike the situation in the *Maisonet* case, the appellant's mill could not easily spread employment sufficiently during the off-season so as to avoid the necessity of overtime work, because just as many man-days of work were performed daily during the the off-season as during the grinding season (R. 114).

<sup>38</sup> There was a shutdown of the mill each week-end in order to perform cleaning and repair operations (R. 83).

court's finding that this shutdown of processing operations lasted only a few hours—even less than a full working shift of 8 hours (97 F. Supp. at 224)—the Record shows that processing operations were suspended in the cane cleaning plant, crushing plant, and sugar warehouse of the mill for 24 hours (Stip. pp. 310, 343, 423), in the boiling house for 16 hours (Stip. pp. 357, 392, 406), and in the power plant for 8½ to 11½ hours (Stip. p. 451). It was only in the fireroom that operations were suspended for only 5 to 7 hours (Stip. p. 437). If actual processing is not necessary to sustain the Section 7(c) exemption during the week-end shutdown, neither is it necessary to sustain such exemption during the off-season.

III. THE APPELLEES WERE NOT "ENGAGED IN [INTERSTATE] COMMERCE OR IN THE PRODUCTION OF GOODS FOR [INTERSTATE] COMMERCE" WHEN THEY WERE ENGAGED IN ANY OF THE FOLLOWING DURING THE PERIOD COVERED BY THE LITIGATION: (A) REPAIRING AND MAINTAINING APPELLANT'S DWELLING HOUSES LOCATED ON THE APPELLANT'S PLANTATION, AND (B) FURNISHING, MAINTAINING, REPAIRING OR SERVICING RELATED DOMESTIC SERVICES OR FACILITIES (FIREWOOD, WATER, ELECTRICITY, BATH HOUSES, SEWAGE DISPOSAL, STREET MAINTENANCE AND CLEANING, PARKS AND PLAYGROUNDS, CLUBHOUSE AND OTHER RECREATIONAL FACILITIES) TO OR FOR THE LESSEES OF SUCH DWELLING HOUSES WHO INCLUDED BOTH EMPLOYEES OF APPELLANT AND OTHERS; BUT ASSUMING THAT THEY WERE "ENGAGED IN [INTERSTATE] COMMERCE OR IN THE PRODUCTION OF GOODS FOR [INTERSTATE] COMMERCE" WHILE PERFORMING SAID WORK, THEY WERE EXEMPT FROM THE OVERTIME PROVISIONS OF THE ACT BY VIRTUE OF SECTION 13(a)(6) OR SECTION 7(C).

The district court held that appellees were engaged in commerce or in the production of goods for commerce when engaged in any of the above activities. 97 F. Supp. at 229 *et seq.*; R. 322. This holding was based upon a series of findings which have no support whatsoever in the Record. All the evidence in the Record bearing upon the issue now being discussed appears in the Stipulation (R. 31, 64, 118-122, 129 *et seq.*, 721, 722; Stip. pp. 744, 759, 768) and in the oral testimony of the appellees (R. 403-614). The material facts revealed by such evidence are set forth below.

#### **A. Facts Concerning Such Housing Maintenance and Services As Shown By Evidence.**

At the time the appellant company was organized in 1898, there was no established community having housing or other services or facilities for living in or near the area which it proposed to devote to the production and processing of sugar cane. Consequently, it became necessary for the appellant over a period of years to construct houses, develop services and otherwise establish facilities for permanent living on the plantation *to serve the needs* of the required number of employees and their families (R. 118). The principal plantation community was established around the plantation buildings and yard area and came to be known as the village of Waialua (R. 119, 721).

Waialua village, which is located within the city limits of Honolulu (R. 31), has all the physical and visual characteristics of an established community and is similar to a typical small village or town of a farming community center. The area is criss-crossed with government roads and highways and also roads and highways constructed and maintained by the appellant (R. 121, 722).

After the plantation was established and continued to operate there gradually grew up an independent community now known as the village of Haleiwa, which is

located off the edge of the plantation, a little more than a mile from the village of Waialua (R. 119). Haleiwa is a small business and residential community made up of privately owned residences and typical small retail and service establishments. Haleiwa caters to appellant's employees and to surrounding community residents, who include persons working at other locations on the Island of Oahu, residents of numerous beach houses and Army and Navy personnel using beach recreational facilities. To some extent the village of Haleiwa has become integrated with the village of Waialua with common fire protection equipment and public police patrol officers serving both communities (R. 122).

As previously pointed out, *supra*, p. 8, no employee of appellant, including each and every appellee herein, was required as a condition of employment to live on the plantation or in plantation houses or to use any service or facility which the appellant furnished or rendered its employees. Some employees of the appellant, including some of the appellees (R. 601), lived off the plantation and in houses not owned or supplied by appellant (R. 428-429, 430, 433).

The relationship existing between the appellant and its employees living in plantation houses was that of landlord and tenant: employees paid cash to the appellant for facilities and other services furnished them (R. 119, 120).<sup>39</sup>

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<sup>39</sup> Prior to November, 1946, the employees of appellant who lived in appellant's dwelling houses received such facilities and services as part of their regular compensation. (R. 118, 119). By the collective bargaining agreement, the wage provisions of which were effective on November 19, 1946 (R. 135, 136-137), this perquisite system was abolished, the value of the perquisites previously allowed being converted into cash wages and the employees in turn paying cash for facilities and services furnished them (R. 119, 136-137; Stip. p. 768). There is nothing in the Record to show whether after this conversion the employees paid back to the appellant the same amounts as rental as they had previously been allowed in perquisites or whether they paid a different amount.

## **B. Unsupported Facts Found by District Court.**

The foregoing facts, shown by the evidence, stand in sharp contrast with the completely unsupported facts found by the district court. Thus the district court found that appellant undertook to create a community at its plantation in order to establish a stable labor supply and to house it at places convenient to appellant's purpose (97 F. Supp. at 213, 229, 230); that existing conditions are such that it has been necessary for appellant to furnish housing and community services to its production employees (*Id.* p. 229); that appellant's villages are located both in isolation and insulation from the rest of the Territory and are many miles from any city, (*Id.*); that no other housing in adequate quantity except that provided by appellant is shown to be available to appellant's employees (*Id.*); that appellant's employees have no real choice over whether they will live in an appellant-owned house and that the "possibility of purchasing homes of their own seems to be a remote and rare occurrence . . . only to an inconsequential extent is it possible for employees to rent, at suitable locations near to their places of work, houses owned by anyone other than [appellant]" (*Id.*, pp. 230-231); that under its collective bargaining agreement appellant expressly undertook to provide dwelling maintenance and repairs and village services (*Id.*, pp. 215, 229); that the work of appellees in maintaining and repairing appellant's houses was a material contribution to the appellant's production of sugar, for without such work the houses and village facilities would fall into disrepair, appellant's employees could not occupy them, and there would be marked interference with the continuation of the production of goods for commerce (*Id.*, p. 231); that rental by appellant of its houses to non-employees is negligible (*Id.*, p. 229); and that after the 1946 conversion of housing and facilities into cash values, the employee paid back to the appellant the same amount as rental (*Id.*).

Each of these findings is either unsupported or rebutted by the evidence:



(i) The Stipulation of the parties shows that the reason why appellant constructed houses and developed services and living facilities for its employees was that there was no community with such facilities near the area which appellant proposed to devote to the production and processing of sugar cane (R. 118). There is no evidence whatsoever which would show that the houses and other living facilities were constructed and developed in order to establish a stable labor supply; nor is there any evidence to show that appellant's labor supply has in fact been stabilized by the establishment of the community.

(ii) There is no evidence to support the court's finding that appellant's villages are isolated communities and insulated from the rest of the Territory, miles from any city. The Stipulation of the parties in fact shows the contrary, for it shows that the plantation is within the limits of the City and County of Honolulu (R. 31) and that Waialua village is adjacent to the built-up community of Haleiwa (R. 119, 122, 721). It further shows that there are main highways running through the village area on which employees may easily travel to and from nearby communities (R. 64, 722).

(iii) The finding that the employees have no choice as to whether they will live in a house owned by the appellant is in conflict with the evidence. Appellees' own witness testified that appellant's employees did have a real choice or opportunity to purchase or rent homes in the community not owned or supplied by appellant. (R. 428-429, 430, 433). See also R. 601. Moreover, the Stipulation shows that during the period covered by the litigation, no employee was required as a condition of employment to live in an appellant-owned house (R. 120), and that in fact some employees lived off the plantation in houses not owned or supplied by appellant (R. 121).

(iv) The evidence does not in any way show that the making of dwelling repairs and the maintenance of related domestic facilities were necessary to appellant's produc-

tion operations and that without such work appellant's employees could not occupy the dwelling houses and there would be a marked interference with the production of goods for commerce.

(v) Still, further, the evidence shows that the appellant did not undertake in its collective bargaining agreement to provide dwelling maintenance and repairs and village services (R. 129 *et seq.*)

(vi) The district court's characterization of rental of houses to non-employees as negligible is difficult to take seriously. Of the 3373 persons who lived on the plantation, 421, or 12½%, were lessees and their families who were not employed by the appellant (R. 120-121).

It seems perfectly clear that had the court not made the unsupported findings dealt with above, but instead had found the facts as they actually appear in the record, it would have been unable to hold that the appellees were within the commerce provisions of the Act when engaged in the activities in question.

**C. While Making Dwelling Repairs or Maintaining Related Domestic Facilities, the Appellees Were Not "Engaged in [Interstate] Commerce or in the Production of Goods for [Interstate] Commerce" <sup>40</sup>.**

1. *The Appellees Were Not "Engaged in [Interstate] Commerce" While Performing Such Work.*

The appellees have previously in this litigation conceded that while performing such work they were not engaged in interstate commerce. Furthermore the district court held that the appellees were covered by the Act while performing such work, not because they were

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<sup>40</sup> It should be noted also that, other questions aside, under their counterclaim, the appellees, who were engaged in this work, had the burden of proving that they were "engaged in [interstate] commerce or in the production of goods for [interstate] commerce". In Section 16(b) actions under the Act such burden is upon the claimants. *Warren-Bradshaw Drilling Co. v. Hall*, 317 U. S. 88, 90. Appellees have utterly failed to sustain this burden.

engaged in interstate commerce, but because they were engaged in the production of goods for interstate commerce. 97 F. Supp. at 226, 229, 230-232. In any event these appellees were obviously not engaged in interstate commerce while performing such work. See *McLeod v. Threlkeld*, 319 U.S. 491, discussed more fully, *infra*, p. 67.

2. *The Appellees Were Not "Engaged . . . in the Production of Goods for [Interstate] Commerce" While Performing Such Work.*

By definition in the Act, applicable during the period involved herein, an employee was deemed engaged in the production of goods if such employee was employed in "producing, manufacturing, mining, handling, transporting, or in any other manner working on such goods, or in any process or occupation necessary to the production thereof, in any State" (Sec. 3(j)).

Activities are "necessary to the production" of goods when they bear a "close and immediate tie with the process of production" for interstate commerce, and not simply a "tenuous relation" to such process. See *Kirschbaum v. Walling*, 316 U.S. 517, 525. And in applying this standard, the Supreme Court has emphasized that Congress in enacting this statute "plainly indicated its purpose to leave local business to the protection of the States," *Walling v. Jacksonville Paper Co.*, 317 U.S. 564, 570; *Higgins v. Carr Bros. Co.*, 317 U. S. 572, 574,<sup>41</sup> and "did not see fit, as it did in other regulatory measures, e.g., the Interstate Commerce Act . . . and the National Labor Relations Act . . . to exhaust its constitutional power over commerce". *10 East 40th Street Bldg., Inc.*

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<sup>41</sup> S. Rep. 884, Committee on Education and Labor, 75th Cong., 1st Sess. p. 5. "The bill carefully excludes from its scope business in the several states that is of a purely local nature. It applies only to the industrial and business activities of the Nation insofar as they utilize the channels of interstate commerce, or seriously and substantially burden or harass such commerce. It leaves to State and local communities their own responsibilities concerning those local service and other business trades that do not substantially influence the stream of interstate commerce."

v. *Callus*, 325 U.S. 578, 579; *McLeod v. Threlkeld*, 319 U.S. 491, 493.

a. THE DECIDED CASES SHOW THAT THE APPELLEES WERE NOT ENGAGED IN THE PRODUCTION OF GOODS FOR INTERSTATE COMMERCE WHILE PERFORMING SUCH WORK.

All other cases under the Act involving employees doing work akin to that now in question have excluded such employees from coverage. None has held them covered other than the decision of the court below.<sup>42</sup>

In *Wilson v. R. F. C.*, 158 F. (2d) 564 (C.C.A. 5), *cert. den.* 331 U.S. 810, Dow Magnesium Corporation and Dow Chemical Company had built and operated plants for producing magnesium and styrene, respectively. The magnesium and styrene were shipped in interstate commerce. Near the location of the two plants, Defense Plant Corporation acquired a 400 acre tract of land and constructed about 2,000 dwelling houses thereon. Employees of the above two plants were the main occupants of the houses. Plaintiffs worked for Defense Plant as firemen and guards of the 400 acre tract of land and the property thereon, and as operators of the plant furnishing water service to such tract. All such employees were held not covered. While it is true, as the court below pointed out, that the court in the *Wilson Case* said that the independence of the employer of the plaintiffs and the employers of the housing occupants insulated the plaintiffs from the status of producers of goods for commerce, the court went on to stress, as an additional and separate ground for not covering said plaintiffs, the fact that their "services benefited the housing occupants not when they were producing goods for commerce but when they were entirely separated from the production of goods for commerce" [Emphasis supplied].

In *Coomer v. Durham*, 93 F. Supp. 526 (W.D. Va. 1950), plaintiffs were employees of a building contractor

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<sup>42</sup> The district court's earlier decision herein (77 F. Supp. 480) had also held them covered.

engaged under contract with certain interstate coal mining companies to construct, remodel and repair dwelling houses for the purpose of furnishing housing to the coal companies' employees. Such houses were either sold or rented by the coal companies to their employees. The court found that it was not necessary for the coal companies to provide housing for their employees and that the houses involved in the case were not located in isolated communities, but rather such communities were near other communities and were located on state highways linked with the federal highway system, thereby being accessible by auto and bus transportation. The court therefore held that the employees of the building contractor were not engaged in an occupation necessary to the production of goods for commerce and denied recovery to the plaintiffs. The very facts emphasized by the court in that case are present in the case at bar also. There is no evidence to show that it was necessary for appellant to provide housing for its employees. Appellant's dwelling houses were not located in any isolated community but rather in Honolulu itself and there were thriving communities all about, with good highways linking with such other communities and in fact with all of Honolulu, *supra*, p. 61.

*Morris v. Beaumont Mfg. Co.*, 84 F. Supp. 909 (W.D. S.C. 1947), is even closer on the facts. Defendant there operated a textile manufacturing plant where it manufactured cotton textiles for interstate commerce. In addition it owned about 280 residences in the City of Spartansburg, rented primarily to its employees (of about 1100 employees, about 490 occupied the residences). The residences were within a radius of one-half mile of the manufacturing plant and were located on city streets, where they were interspersed with other dwellings not owned by the defendant. Occupancy of the residences was optional with the employees. Plaintiffs were painters or carpenters who in some workweeks were engaged exclusively in constructing, maintaining or repairing the

residences. The court held that the plaintiffs were not engaged in the production of goods for commerce and pointed out that the Wage-Hour Division had ruled that the defendant had complied with the Act. It said that the residences upon which the plaintiffs worked were in no sense devoted to manufacture for commerce and nothing was done therein to promote the production of goods for commerce. None of defendant's business activities was attended to, carried on, or considered in the residences.

The Supreme Court has stated that the problem is essentially one of degree as to the number of "steps removed from the physical process of the production of goods" for interstate movement. *10 East 40th Street Bldg., Inc. v. Callus*, 325 U.S. 578, 583.

The following factors placed the appellees beyond the scope of the Act.

*First*, they worked on homes the occupancy of which was optional with the production employees, including each employee appellee herein (R. 120). The employees could live anywhere they chose, whether on or off the plantation. There were other nearby communities where they could live. The district court's findings to the contrary, as we have shown, are in conflict with the evidence.

*Second*, there is no evidence to show that the making of dwelling repairs and the maintenance of related domestic facilities were necessary to appellant's production operations, or that such operations were any more efficient because the employees did live on the plantation, or that those employees living off the plantation were any less efficient than those living on the plantation.

*Third*, the appellees were employed on houses, facilities and services which were not themselves produced for or shipped in interstate commerce, nor were they used in or devoted to the production of goods for interstate commerce. They merely "serve[d] the needs" of the employees, as the parties stipulated (R. 118), when their occupants were *not* engaged in such production at all, but

where wholly separated therefrom in space and function. Such services were as remote from production for commerce as if provided in a village not owned by the appellant.

b. THE CASES RELIED UPON BY THE DISTRICT COURT ARE INAPPOSITE.

(1) *Cookhouses Cases.*

The district court relied in large part for its conclusion that the work here in question was covered by the Act upon the opinion of this Court in *Consolidated Timber Company v. Womack*, 132 F. (2d) 101, in which this Court held the Act applicable to the employees of a cookhouse operated by an employer engaged in logging operations. The decision of this Court in the *Womack* case was in turn based on the decision of the Supreme Court in *Philadelphia, B. & W. R. Co. v. Smith*, 250 U.S. 101, in which the Supreme Court held that a cook, employed by a railroad on a camp car used for feeding and housing railroad bridge carpenters, was engaged in interstate commerce within the meaning of the Federal Employers' Liability Act. In the decision in the *Womack* case this Court quoted from the Supreme Court decision and stated: "The reasoning used by the Supreme Court in solving the problem in the above case is applicable to the case at bar." 132 F. (2d) at 105.

However, six months after the decision of this Court in the *Womack* case the Supreme Court ruled that its decision in the *Smith* case "should not govern our conclusions under the Fair Labor Standards Act". This ruling was made in *McLeod v. Threlkeld*, 319 U.S. 491 at 496. In that case the Supreme Court held that a cook engaged in furnishing meals to maintenance-right-of-way employees of a railroad were not engaged in interstate commerce within the meaning of the Fair Labor Standards Act. The employees worked for a partnership which was under contract with the railroad to furnish the meals. The Supreme Court indicated that whether the meals

were furnished by the railroad itself or by a contractor with the railroad was not significant. The opinion contains the following:

“It is not important whether the employer, in this case the contractor, is engaged in interstate commerce. It is the work of the employee which is decisive. Here the employee supplies the personal needs of the maintenance-of-way men. Food is consumed apart from their work. The furnishing of board seems to us as removed from commerce, in this instance, as in the cases where the employees supply themselves. In one instance the food would be as necessary for the continuance of their work as in the other.” 317 U.S. at 497.

The issue in the *Threlkeld* case had to do with whether the cook was engaged in *interstate commerce* because serving food to others so engaged. The reasoning of the Supreme Court would be equally applicable to a case involving the issue of whether a cook is engaged in the *production of goods for interstate commerce* because serving food to others so engaged. In either case the persons served need food, whether it is supplied by themselves or by their employer. It appears therefore that the basis of the decision in the *Womack* case has been removed, and that the district court erred in relying on that decision.

Furthermore the *Womack* case is not applicable to the instant case, for reasons stated below.

In the decision in the *Womack* case, this Court, in applying the reasoning of the *Smith* case, stated that the cookhouse employees were sustaining the loggers by keeping their board close to their place of work, thus rendering it easier for the employer “to maintain a proper organization of its loggers and forwarding their work by furnishing the food whereby the men were given the strength to pursue their labors.” 132 F. (2d) at 105-106. On the other hand there is nothing in the Record to show in the instant case that without the housing and related domestic facilities the appellant’s operations would have



been hampered in any way, or that the furnishing of such housing and related facilities did in fact assist the appellant in maintaining a proper organization of its employees or forwarded their work.

In the *Womack* case some of the meals furnished to employees were necessarily furnished during periods falling between the commencement and ending of the day's work. In this respect the facts in the *Womack* case are similar to the facts in the *cafeteria* cases, discussed below. On the other hand the employees in the instant case who made dwelling repairs and maintained related domestic facilities "serve[d] the needs" of the production employees (R. 118) only when the latter were completely separated in space and function from the production of goods for interstate commerce.

Still further, the Court in the *Womack* case emphasized that the cookhouse was not operated to show a profit and that the service there was sold at cost, 132 F. (2d) 101 at 103, 107. In the instant case, however, the appellant, while it agreed not to make housing a profit-making venture as such, did make a profit out of such housing, for in the collective bargaining contract fixing the rental rates, the appellant was allowed a return on its invested capital (R. 175).<sup>43</sup>

## (2) *Cafeteria Cases*

The court below also relied upon cases holding covered employees working in a cafeteria or canteen located in a plant producing goods for commerce and serving the employees working in such plant. *Ferguson v. Prophet* (S.D.

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<sup>43</sup> *Hanson v. Lagerstrom*, 133 F. (2d) 120 (C.C.A. 8), another cookhouse case relied on by the district court (97 F. Supp. at 227), was based on the decision in the *Womack* case. It also was decided prior to the decision of the Supreme Court in the *Threlkeld* case. *Walling v. Armstrong Co.*, 68 F. Supp. 870 (D. Mass. 1946), also relied on by the district court (97 F. Supp. at 228), dealt with the status of employees who engaged in the production of food and other items which were actually transported in interstate commerce.

Ind. 1946) 11 Labor Cases, ¶ 63297; *McComb v. Factory Stores*, 81 F. Supp. 403 (N.D. Ohio 1948); and *Basik v. General Motors*, 311 Mich. 705, 19 N.W. (2d) 142 (1945). Holding to the contrary under these circumstances are *Kuhn v. Canteen Food Service*, 77 F. Supp. 585 (N.D. Ill. 1944), appeal dismissed 150 F. (2d) 55 (C.C.A. 7); *Bayer v. Courtemanche*, 76 F. Supp. 193 (D. Conn. 1947); and *Tipton v. Sprott*, 93 F. Supp. 496 (S.D. Calif. 1950).<sup>44</sup>

Aside from the fact that the cafeteria cases are in conflict with each other and that those which were relied on by the district court are in conflict with the reasoning of the Supreme Court in the *Threlkeld* case, they are readily distinguishable on their facts from the case here. In the cafeteria cases relied on by the district court, the courts found that the production efficiency of the employees was increased and a higher production level was maintained through the operation of the cafeterias and canteens. See, for example, *Basik v. General Motors Corp.*, 311 Mich. 705 at 708. In the case at bar, however, there is nothing in the evidence from which it may be inferred that the appellant's plantation operations were any more efficient because the employees lived on the plantation.

Moreover, while it is well recognized, as shown by the *Basik* case, that the serving of hot lunches to industrial employees increases their efficiency, it has never been shown that labor efficiency is increased by having employees reside in dwellings near their place of employment.<sup>45</sup>

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<sup>44</sup> The court below attempted to distinguish the cafeteria decisions holding to the contrary on the ground that the cafeteria in such cases was not operated by the producing plant itself but by an independent concern. But in the *Prophet* and *Factory Store* cases, where the courts held the cafeteria employees covered, the cafeteria was also operated by an independent concern.

<sup>45</sup> The district court recognized herein, 97 F. Supp. at 228-229, that in those cases where the cafeteria employees were held not covered by the Act, the courts emphasized the facts that the producing plant was not in an isolated spot, there were other available

Furthermore, unlike the situation in the cafeteria cases, the employees in the instant case, who made housing repairs and maintained related domestic facilities, "serve[d] the needs" of the production employees (R. 118) only when the latter were completely separated in space and function from the production of goods for commerce. In the cafeteria cases the cafeteria employees worked right in the plant where goods were produced for commerce. Here, the appellees worked at the homes of the employees who *elsewhere* produced goods for commerce and who occupied these homes when they were *not* engaged in production.

The work performed by appellees in making dwelling repairs and maintaining related domestic facilities is indistinguishable in principle from the essentially local repair activities of plumbers, carpenters, electricians, housepainters and others in local trade in innumerable villages, towns and cities in the United States. The only difference is that here the appellees were employed by the producer of goods for commerce—a difference which is not relevant for, as the U. S. Supreme Court has repeatedly held, the coverage of the Act is based upon the activities and work of the individual employee and not upon the business of his employer. *Kirschbaum v. Walling*, 316 U.S. 517, 524; *Walling v. Jacksonville Paper Co.*, 317 U.S. 564, 571-72; *Mabee v. White Plains Publishing Co.*, 327 U.S. 178, 184-185. To bring these appellees within the coverage of the Act is to wipe out entirely the distinction between local and interstate activities and to sweep under the Act those essentially local activities which Congress intended to leave to the protection of the States. *Supra*, p. 63.

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and adequate eating places nearby, many of the plant employees ate outside the plant cafeteria, and the cafeteria represented only a convenience rather than a necessity to the plant employees. These factors, as we have shown, were also present in the case at bar so far as appellant's housing and related domestic facilities were concerned.

C. THE ADMINISTRATOR HAS NEVER TAKEN THE POSITION THAT EMPLOYEES ENGAGED IN SUCH WORK ARE ENGAGED IN THE PRODUCTION OF GOODS FOR INTERSTATE COMMERCE, AND HAS NEVER ENFORCED THE ACT IN HAWAII WITH RESPECT TO SUCH EMPLOYEES.

The Administrator, in reply to inquiries, has always stated that he was not prepared to express an opinion as to the coverage under the Act of employees repairing and maintaining houses owned by their employer and occupied as residences by other employees who were engaged in the employer's plant in producing goods for commerce (1944-45 WHMan., p. 97). Moreover, when this case was previously before this Court, the Administrator filed a brief *amicus*, in which he repeated that he took no position as to the coverage of employees of appellant while engaged in such work.

Furthermore, although he has maintained an office in Hawaii since the beginning of his enforcement activity under the Act and has conducted frequent inspections on Hawaiian sugar plantations to check on compliance with the Act, he has never enforced the Act with respect to employees engaged in the activities in question. The plantations generally, including appellant's, have always treated such employees as outside the commerce provisions of the Act and the Administrator has never so much as hinted that in doing so they were violating the Act.

**D. If the Work of the Appellees Here in Question Were an Engagement in "[Interstate] Commerce or in the Production of Goods for [Interstate] Commerce", the Appellees Performing Such Work Were Exempt From the Overtime Provisions of the Act by Virtue of Section 13(a) (6) or Section 7(c).**

If the Court should not agree with us and hold that the work here in question was an engagement in interstate commerce or in the production of goods for interstate commerce, then we submit that such holding would bring

such work within the Section 13(a)(6) or Section 7(c) exemptions.

1. Activities so related to the production, cultivation, harvesting and processing of sugar cane that they are in interstate commerce or necessary for the production of goods for interstate commerce must necessarily be so sufficiently related to such activities as to share in the broad exemption provided for such activities. This is clearly shown by a comparison of the crucial statutory language defining the coverage of the Act on the one hand and the agriculture exemption on the other.

Whether the making of dwelling repairs and the maintenance of related domestic facilities were necessary to the production of goods for commerce was determined by the definition of "produced" contained in Section 3(j). Such definition read:

"'Produced' means produced, manufactured, mined, handled, or in any other manner worked on in any State; and for the purposes of this Act an employee shall be deemed to have been engaged in the production of goods if such employee was employed in producing, manufacturing, mining, handling, transporting, or in any other manner working on such goods, or in any *process or occupation necessary to the production thereof*, in any State" [Emphasis Supplied].

Whether such work came within the agriculture exemption in turn depended upon the definition of agriculture contained in Section 3(f). Such definition read in relevant part:

"'Agriculture' includes . . . *any practices* (including any forestry or lumbering operations) performed by a farmer or on a farm as an *incident to or in conjunction with such farming operations* . . ." [Emphasis supplied].

For the Court to hold the work in question covered by the Act requires it to hold that such work was *necessary* to the production of appellant's sugar cane and its processing. On the other hand, for such work to come within the agriculture exemption it need only be shown that the

work was carried on by appellant as an *incident to or in conjunction with* appellant's farming operations. This statutory comparison shows that it would be arbitrary and unreasonable to hold that appellant's production and processing of sugar cane were so dependent upon its dwelling repairs and maintenance of related domestic facilities as to make the latter necessary to such production and processing of sugar cane, without at the same time holding that the dwelling repairs and maintenance of related domestic facilities were incident to or in conjunction with the sugar cane production and processing.

2. By the same token, the Section 7(c) exemption is applicable to the appellees when engaged in these activities. The Administrator has said that the Section 7(c) exemption applies not only to those employees processing sugar cane, but also to those employees whose operations are "a necessary incident" to sugar cane processing and who work in those portions of the premises devoted to sugar cane processing. *Infra*, p. 121. If the appellees are deemed necessary to the production of raw sugar for commerce when engaged in dwelling repairs and maintenance of related domestic facilities, likewise their operations were "a necessary incident" to the operation of processing sugar cane.

**IV. ANY APPELLEE, WHO IN THE SAME WORKWEEK PERFORMED WORK, SOME OF WHICH WAS EXEMPT UNDER SECTION 13(a)(6) AND THE REMAINDER OF WHICH WAS EXEMPT UNDER SECTION 7(c), OR PERFORMED WORK, SOME OF WHICH WAS NOT AN ENGAGEMENT IN COMMERCE OR IN THE PRODUCTION OF GOODS FOR COMMERCE AND THE REMAINDER OF WHICH WAS EXEMPT UNDER SECTION 13(a)(6) OR SECTION 7(c), WAS EXEMPT FOR THAT WORKWEEK FROM THE OVERTIME PROVISIONS OF THE ACT.**

Some of the appellees did work in the same workweeks with respect to the appellant's dwelling houses or related domestic facilities and also with respect to the appellant's

field, hauling or mill equipment. R. 223-231, 235-239, 243-256, 266-273, 277-283. Their work with respect to the dwelling houses and related domestic facilities was not within the coverage provisions of the Act at all (or if it was, was exempt by virtue of Section 13(a)(6) or Section 7(c)), and their work on the field, hauling or mill equipment was exempt under either Section 13(a)(6) or Section 7(c).

In such situation, where in the same workweeks appellees performed both work that was not sufficiently close to commerce or to the production of goods for commerce to be considered covered by the Act at all, and work that was exempt under Section 13(a)(6) or Section 7(c), they were obviously excluded from the overtime provisions of the Act.<sup>46</sup> The Administrator is in accord. WHM 35:768. The rule is the same with respect to an appellee who worked part of the workweek in an activity deemed exempt under Section 13(a)(6) and the remainder in an activity deemed exempt under Section 7(c). 3 CCH Labor Law Reporter, ¶ 24105.27.

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<sup>46</sup> *Fitzgerald v. Kroger Grocery*, 45 F. Supp. 812 (D. Kans. 1942) holding exempt from the overtime provisions under Section 13(b)(1) employees who in the same workweeks were engaged in driving trucks in interstate commerce—an activity exempt under Section 13(b)(1)—and other driving which was wholly in intrastate commerce and hence not covered by the Act at all.

The same principle applies to appellees other than those working in the service shops. For example, appellee S. Robello worked in the power plant of the mill (R. 218-220). Power there produced was used in the field and mill operations of the appellant, and appellee Robello was thereby entitled to the Section 13(a)(6) or Section 7(c) exemptions. Power was also distributed in the same workweeks and in fact at the same time to the plantation dwelling houses and to some non-plantation users, but none of such power was used for or in connection with the production of goods for interstate commerce, nor was it used to operate any instrumentality of interstate commerce, nor was it transmitted into interstate commerce (R. 91, 92; 97 F. Supp. at 207). Appellee Robello was thus in the same workweeks doing some work exempt under Section 13(a)(6) or Section 7(c) and other work not covered by the Act at all. As explained in the text, he was therefore excluded from the overtime provisions of the Act during such workweeks.

**V. ANY APPELLEE, WHO IN A WORKWEEK PERFORMED WORK WHICH WAS EXEMPT UNDER SECTION 13(a)(6) OR SECTION 7(c), AND DID NOT ENGAGE FOR A SUBSTANTIAL PART OF HIS TIME IN THE SAME WORKWEEK IN AN ACTIVITY WHICH WAS NOT SO EXEMPT, WAS EXEMPT FOR THAT WORKWEEK FROM THE OVERTIME PROVISIONS OF THE ACT.**

We have contended above that all the work performed by the appellees during the workweeks covered by the litigation was exempt under either Section 13(a)(6) or Section 7(c).<sup>47</sup> But if this Court is of the view that some of the activities of the appellees were not exempt under Section 13(a)(6) or Section 7(c), it becomes material to ascertain the extent to which an employee may engage in non-exempt work in a workweek without losing the exemption otherwise applicable to him during that workweek.

The court below evidently took the position that an appellee, whose other work in a workweek was exempt under Section 13(a)(6) or Section 7(c), lost the exemption for the entire week if he devoted as much as 10 or 20 minutes in the week to a non-exempt activity. 97 F. Supp. at 232-233. We submit that this ruling is unnecessarily harsh and renders meaningless for all practical purposes the exemptions provided by Section 13(a)(6) and Section 7(c). On most farms there is no such thing as the complete segregation of employees and activities. An employee will perform whatever duties are necessary to the farm's operations. But if the agricultural exemption in the Act is to be narrowly construed so that many activities performed on the farm are to be deemed non-exempt, then under the ruling of the court below the agricultural exemption is of no avail to the farmer. The

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<sup>47</sup> We contend therefore that the district court erred in finding that as a general rule the engagement by appellees in non-exempt activities was substantial. 97 F. Supp. at 232.



court's ruling means that in performing the operations necessary and indispensable to farming, the exemption is lost. And the same result follows with respect to the processing exemption provided by Section 7(c).

We submit, therefore, that Congress intended the exemption to apply to an employee in any workweek in which he does not devote a *substantial part* of his time to an activity not exempt under Section 13(a)(6) or Section 7(c). This rule takes cognizance of the realities of a farmer's or processor's operations. Moreover, it comports with the rules laid down by the Administrator with respect to many other exemption provisions in the Act. In the case of the exemptions for executives, administrative employees, professionals, local retailing capacity employees and outside salesmen; retail establishments;<sup>48</sup> seamen; carriers by air; fishery employees; local newspapers; street and suburban railways and local trolley and motor bus operators; switchboard operators; employees engaged in forestry or lumbering operations; and employees of employers subject to Part I of the Interstate Commerce Act, the Administrator has permitted a tolerance of nonexempt work ranging from 20% to 49.999%. The Administrator has specifically said that these percentages of nonexempt work are insubstantial. The Administrator's rulings concerning these several exemptions are detailed in Appendix E herein, pp. 124-125, *infra*.

The reason for allowing a tolerance of nonexempt work in the case of exemptions is that many employees in

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<sup>48</sup> With respect to the Section 13(a)(2) retail establishment exemption, the Administrator allowed a tolerance of 25% of nonexempt work in a workweek without loss of the exemption. (Administrator's Interpretative Bulletin No. 6, ¶18; 3 CCH Labor Law Reporter ¶24,480). He did this under such exemption prior to its amendment by the Fair Labor Standards Amendments of 1949 (63 Stat. 910) which specifically established a 25% tolerance of nonexempt work for retail establishments. The courts applied the tolerance test in many cases. (*Harris v. Hammond*, 145 F. (2d) 333, 334 (C.C.A. 5) *cert. den.* 324 U.S. 859; *Northwestern Hanna Fuel Co. v. McComb*, 166 F. (2d) 932, 937-938 (C.C.A. 8); *Brown v. Minnigas Co.*, 51 F. Supp. 363, 371 (D. Minn. 1943)).

occupations intended by Congress to be exempt under one or another of the exemption provisions perform some duties which do not strictly fall within the literal language of the exemption provisions. A failure to allow some tolerance therefore would result in so widespread a denial of the exemption provisions as to substantially defeat the Congressional intention in enacting them. This reason applies equally to the Sections 13(a)(6) and 7(c) exemptions particularly in view of the breadth that Congress intended to accord such exemptions.

### CONCLUSION

For the foregoing reasons it is respectfully submitted that the following parts of the Judgment below should be reversed:

A. Part I, paragraph B, paragraphs C1.b. C2.b, C3.b, C4.b, C5.b, C8 - C11, inclusive, C12.a and c, C13.a and c, C14.a and c, C15.a and c, C16.a and c, C17.a and c, C18.a and c, C19.a and c, C20 - C35, inclusive, C36.b, C37 - C42, inclusive, and paragraph D.

B. All of Part II, paragraphs A, B, C, and D.

Respectfully submitted,

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## APPENDIX A

### Clearly Erroneous Findings of Fact of District Court

The findings of fact of the district court which are clearly erroneous and which appellant specifies as error are the following:

1. Finding that sugar cane "cannot be stored more than 2 or 3 days without spoiling." 97 F. Supp. at 203.

This finding is clearly erroneous because the evidence shows that to avoid serious losses, sugar cane must be processed into sugar, syrup, or molasses within a few hours after it has been severed from the ground. (R. 33, 67). Nothing in the Record suggests that it can be stored for as many as two to three days without spoiling.

2. Findings that (a) the main line railroad of appellant is used to haul sugar cane from points where cane cars have been "concentrated" to the mill and the point of such concentration is the point where the main line track is joined by the portable track (97 F. Supp. at 205, 222); (b) some appellee employees assemble the appellant's harvested crop at "centralized" points on appellant's main line railroad to commence transportation to the mill (97 F. Supp. at 220); and (c) appellant's cane cars are concentrated upon the appellant's main line railroad, "for transport, through intermediate processing, to the sugar refinery". (97 F. Supp. at 220).

These findings are clearly erroneous because there is no evidence in the Record to show that cane cars were centralized or concentrated on appellant's plantation at any point. Rather the evidence shows that cane cars on appellant's plantation moved directly from the fields to the mill both on portable tracks and main line tracks in one continuous operation. (R. 60, 61-62).

3. Finding that bagasse in appellant's mill serves as an economical source of fuel for the production of power. 97 F. Supp. at 207.

This finding is misleading and therefore clearly erroneous, because it does not add the material fact, shown by the evidence, that the production of such power was required for use in performing the mill's processing operations. (R. 86).

4. Findings that (a) appellant undertook to create a community at its plantation in order to establish a stable labor supply and to house it at places convenient to appellant's purpose (97 F. Supp. at 213); (b) "Historically, [appellant] constructed [its dwelling] houses and established [its] villages for the purpose of supplying necessary dwellings for a stable labor pool which [appellant] desired to be in close proximity to its operations" (97 F. Supp. at 229); and (c) "In origin and history, Waialua village was and remains a mill village, company-owned and company-controlled, in every sense of that term. The same is true of the smaller villages on [appellant's] plantation where its employees occupy company-owned dwellings. All these villages, and all of the buildings, houses, and other facilities existing therein, were created by [appellant] for the purpose of providing housing and community services for a stable supply of labor". (97 F. Supp. at 230).

These findings are clearly erroneous because there is no evidence to support them. The evidence shows only that at the time the appellant company was organized, there was no established community having housing or other services or facilities for living in or near the area which appellant proposed to devote to the production and processing of sugar cane, and therefore appellant constructed houses and developed services and living facilities for its employees and their families. (R. 118).

5. Finding that under its collective bargaining agreement appellant "expressly undertakes to provide dwelling maintenance and repairs, and village services". 97 F. Supp. at 215, 229.

This finding is clearly erroneous because the collective bargaining agreement contained no such undertaking by appellant. (R. 129 *et seq.*)

6. Finding that appellant's activities constituted a number of separate and distinct enterprises which taken together constitute a hybrid type of business, and that in the conduct of such enterprises appellant has assumed a variety of functions, including those of farmer, carrier, manufacturer, shipper, and operator of village communities. 97 F. Supp. at 218, 222.

This finding is clearly erroneous because in conflict with the evidence which shows that appellant was engaged in but one enterprise, namely, the production and processing of sugar cane. (R. 31).

7. Findings that (a) since 1943, during the off-season, overtime has been paid by appellant for hours in excess of 40 per week to all its mill and shop employes (97 F. Supp. at 219); and (b) appellant "has never treated repair shop employees as falling under the agricultural exemption" as is shown by such overtime payment. 97 F. Supp. at 225.

These findings are clearly erroneous because the evidence shows that certain of the repair shop employees did not receive overtime compensation for their hours over 40 in a week during either the grinding season or the off-season (appellees Ezawa (Stip. p. 542-543, 553); Reyher (Stip. pp. 526-527, 538); Mori (Stip. pp. 596-597, 605); Sakai (Stip. pp. 628-629); and Kashiwabara (Stip. pp. 709-710, 722)). Others of the repair shop employees were paid such overtime in one or two weeks of the off-season but in most such weeks were not so paid (appellees Claunan (Stip. pp. 557-558, 569); Yamada (Stip. pp. 589-590, 593); and A. Robello (Stip. pp. 573-574, 585)). The district court itself made findings showing that the repair shop employees mentioned did not generally receive overtime compensation after 40 hours per week dur-

ing the off-season. (R. 221, 232-233, 240-241, 256, 259-260, 264-265, 274-275, 277-278).

8. Finding that the agricultural aspect of appellant's operations terminates "with the concentration of cars loaded with cane, upon the main line railroad operated by [appellant], for transport, through intermediate processing, to the sugar refinery". 97 F. Supp. at 220.

This is a legal conclusion which is clearly erroneous, for the reason that the agriculture exemption in the Act included the hauling of sugar cane produced by appellant from the fields to the mill, the processing of such sugar cane into raw sugar and molasses, the temporary storage, loading and shipment of such raw sugar and molasses, the repair, maintenance and servicing of hauling, processing and field equipment and facilities, and such other incidental operations as were necessary and indispensable to the foregoing.

9. Findings that (a) Appellant's train crews are not engaged in "any act of producing sugar cane, or in any act incidental to or conjoint with the production of sugar cane; nor in processing cane into sugar at the mill, where the processing occurs" (97 F. Supp. at 220); (b) it is immaterial to the determination of the applicability of the Section 13(a)(6) or Section 7(c) exemptions in the Act, that the train crews are employed by the same company which employs the farm hands and the processing crews (97 F. Supp. at 220); (c) "Railroading is not farming or processing, nor intended by the Act to be a part of either" (97 F. Supp. at 221); (d) "The activities of the [appellant's] railroad crew, and of those employed in activities relating to maintenance, upkeep and operation of the main line railroad system, occur subsequently to and independently of the [appellant's] farming activities, albeit coordinated thereto" (97 F. Supp. at 221); and (e) "Hauling cane on the [appellant's] main line railroad is not a part of harvesting operations,

since the gathering of the crop is completed on the fields on which it is grown prior to transportation; and such transportation constitutes neither a storing of such crops, nor transportation either to storage or market". (97 F. Supp. at 222).

These are all clearly erroneous legal conclusions. Appellant's train crews, including those engaged in maintaining and repairing the main line tracks, were engaged in "farming," "harvesting," and in "practices . . . performed by [appellant] or on [appellant's] farm as an incident to or in conjunction with [its] farming operations" within the meaning of the Section 13(a)(6) agriculture exemption in the Act. Furthermore, appellant's train crews also fell within the Section 7(c) processing exemption in the Act. Still further, it *was* material to the application of the Section 13(a)(6) exemption in the Act that appellant's train crews transported only the cane which appellant grew, and it *was* material to the application of the Section 7(c) processing exemption that the train crews were employed by the same employer which employed the processing crews.

10. Finding that appellant has not treated its railroad employees as within the exemption of Section 13(a)(6), for "during off-season these employees have been paid overtime after 40 hours of work". 97 F. Supp. at 221.

This finding is clearly erroneous because in conflict with the evidence, which shows that certain of the railroad employees did not receive overtime during the grinding or off-seasons until after 48 hours of work in a week. (Appellees Sera (Stip. pp. 260-270) and T. Okouchi (Stip. pp. 271-283)). The district court in fact elsewhere so found. (R. 209, 210-211).

11. Findings that (a) appellant distinguishes on its records of operating costs between harvesting and main line transportation (97 F. Supp. at 221); and (b) in the maintenance of its records, appellant separates field

activities from transportation at the point where cane cars are placed on the main line railroad. (97 F. Supp. at 222).

These findings are clearly erroneous and misleading, because the evidence shows that appellant also distinguished on its records of operating costs between harvesting and *field* transportation and on such records separated field activities from transportation at the point where cane cars were placed on *portable tracks in the fields*. (R. 178).

12. Finding that appellant's permanent main line transportation is not located on a farm. 97 F. Supp. at 222.

This finding is clearly erroneous because in conflict with the evidence which shows that such main line transportation *was* located on a farm. (R. 59, 721, 722).

13. Finding that appellant's mill operations are so conducted as to assume the character of a distinct business enterprise of an industrial nature. 97 F. Supp. at 222.

This finding is clearly erroneous because the evidence shows that appellant's mill operations were not a distinct business enterprise but rather constituted either "harvesting" or "practices . . . performed by [appellant] or on [its] farm as an incident to or in conjunction with [its] farming operations, including preparation for market" within the meaning of the Section 13(a)(6) agriculture exemption. Appellant's mill operations were but an integral and necessary part of its total farming operations. (R. 35-36, 94).

14. Finding that appellant's mill operation is not a subordinate part of farming. 97 F. Supp. at 223.

This finding is clearly erroneous because in conflict with the evidence, which shows that in terms of effort as represented by hours of labor and in terms of expense as represented by operating charges, appellant's mill



operations were clearly subordinate to its cultivating, irrigation, harvesting, and other general field operations. (R. 178).

15. Findings that the activities of appellant's employees, including appellee Carrit, which were performed in connection with bagasse and the generation of electricity, are not a part of appellant's processing operations. 97 F. Supp. at 223; R. 216.

These findings are clearly erroneous because in conflict with the evidence, which shows that the activities in question were a necessary and integral part of appellant's processing operations. (R. 85 *et seq.*)

16. Finding that appellant's off-season operation preserves and enhances its capital investment. 97 F. Supp. at 224.

This finding is clearly erroneous, for there is no evidence in the Record to support it. The evidence shows only that the off-season operation was merely necessary repair and reconditioning work required to permit the mill to continue operating efficiently. (R. 109, 111, 112).

17. Finding that appellant's repair and service shop employees perform no work "of an agricultural nature, or at a time or place conjoint with or incidental to the farming process, or on a 'farm'" as that term is used in the Act. 97 F. Supp. at 225.

This finding is clearly erroneous because the work of appellant's repair and service shop employees constituted "farming" as well as "practices . . . performed by [appellant] or on [appellant's] farm as an incident to or in conjunction with [its] farming operations".

18. Finding that the work of appellant's repair shop employees is "not that of engaging in processing, or in any part of processing, nor is their work so integrated with processing as to be a portion thereof, incapable of segregation". 97 F. Supp. at 225.

This finding is clearly erroneous because the work of appellant's repair shop employees fell within the Section 7(c) processing exemption as being the work of "employees in [a] place of employment where [their employer] [was] . . . engaged . . . in the processing of . . . sugar cane . . . into sugar".

19. Finding that

"Repair shop employees are not occupationally attached to the mill. The headquarters out of which they work is in each instance a separate structure, in which they generally perform the major portion of their work, to which they regularly report each day, and in which they receive supervision and instructions". 97 F. Supp. at 225.

This finding is clearly erroneous because in conflict with the evidence, which shows that most of the repair shop employees did not generally perform the major part of their work in the shops (appellees Oato (Stip. pp. 364-365, 367, 368-374), Reyher (Stip. pp. 524-537), A. Robello (Stip. pp. 571-585), Yamada (Stip. pp. 587-592), Mori (Stip. pp. 596-604), Sakai (Stip. p. 636), Kashiwabara (Stip. pp. 707-721). The district court itself made findings showing that some of these appellees did not generally perform most of their work in the shops. (R. 256, 259, 264, 273-274).

20. Finding that the repair shops constitute and are "self-sufficient units, operated not as an incident to any other operation exclusively or dominantly, but rather as an integral part of the over-all combination of separate enterprises jointly conducted by [appellant]". 97 F. Supp. at 225.

This finding is clearly erroneous because the repair shops were operated by appellant and on its farm "as an incident to or in conjunction with" its farming operations and were necessary to its cane growing and processing operations. (R. 94).

21. Finding that existing conditions are such that it has been necessary for appellant to furnish housing and community services to its production employees. 97 F. Supp. at 229.

There is no evidence in the Record to support this finding and it is therefore clearly erroneous.

22. Findings that (a) the appellant's villages "are located both in isolation and insulation from the rest of the Territory; these villages are located upon [appellant's] lands, and are many miles from any city" (97 F. Supp. at 229), and (b) "no other housing in adequate quantity, except that provided by [appellant], is shown to be available to [appellant's] employees". 97 F. Supp. at 229.

These findings are clearly erroneous, for the evidence in the Record shows that appellant's villages are within the limits of the City and County of Honolulu (R. 31) and adjacent to the built-up community of Haleiwa. (R. 119, 122, and 721). The evidence further shows that there are main highways running through the village areas on which employees might easily travel to and from nearby communities. (R. 64, 722).

23. Findings that (a) the maintenance of village facilities and dwelling repairs were carried on by appellant "as a part of its over-all production operations, not as a matter of mere convenience for its employees" (97 F. Supp. at 229); (b) "the operation and conduct of village facilities and housing are historically and presently an integral part of [appellant's] production effort" (97 F. Supp. at 229); and (c) "The work done by [appellant's] employees in maintaining and keeping in proper condition the housing occupied by its production workers, is neither trivial nor insignificant to [appellant's] business of producing sugar. It represents a material contribution to [appellant's] production of sugar. Without the performance of such repair and maintenance work, [appellant's]

housing and village facilities would fall into disrepair. Its employees would be unable to continue to occupy them, and there would be marked interference and damage to the continuation of production of goods for commerce". 97 F. Supp. at 231.

These findings are clearly erroneous, for there is no evidence in the Record to support them.

24. Finding that rental by appellant of houses on its plantation to non-employees is negligible. 97 F. Supp. at 229.

This finding is clearly erroneous because the evidence in the Record shows that of the 3,373 persons who lived on the plantation, 421, or 12½%, were lessees and their families who were not employees of the appellant. (R. 120-121).

25. Finding that after the 1946 conversion of housing and related domestic facilities into cash values, the employee paid back to the appellant the same amount as rental. 97 F. Supp. at 229.

There is no evidence in the Record to support this finding and it is therefore clearly erroneous.

26. Finding that ingress and egress to appellant's villages are subject to the appellant's control. 97 F. Supp. at 230.

There is no evidence in the Record to support this finding and it is therefore clearly erroneous.

27. Finding that

"While [appellant's] employees are not required under the collective bargaining agreement to live in company-owned houses, there is no evidence that they have any real choice over the matter. The possibility of purchasing homes of their own seems to be a remote and rare occurrence; the unique system of semi-feudal land tenure plays a role. Only to an inconsequential extent is it possible for employees to rent, at suitable locations near to their

places of work, houses owned by anyone other than [appellant]." 97 F. Supp. 230-231.

This finding is clearly erroneous, because in conflict with the evidence. Appellees' own witness testified that appellant's employees had a real choice or opportunity to purchase or rent homes in the community not owned or supplied by appellant. (R. 428-429, 430, 433). See also R. 601. Furthermore, some employees lived off the plantation in houses not owned or supplied by appellant. (R. 121). And the independent community of Haleiwa was located off the edge of appellant's plantation (R. 119).

28. Finding that the carpenters, painters, plumbers, and others working in connection with appellant's villages were covered by the Act "because they contributed to 'The maintenance of a safe, habitable building' . . . which was, in turn necessary to house, maintain, and keep in desired proximity to [appellant's] operations, employees whose work involved them directly in the production of goods for commerce". 97 F. Supp. at 232.

This finding is clearly erroneous because there is no evidence to support it.

29. Finding that as a general rule the engagement by appellees in non-exempt activities was substantial. 97 F. Supp. at 232.

This finding is clearly erroneous because all the work of appellees in every workweek during the period covered by the litigation was exempt under Section 13(a)(6) or Section 7(c) of the Act.

30. Finding that at times certain of the appellees attached to appellant's field operations department performed non-agricultural activities. (R. 190).

This finding is clearly erroneous because all the appellees, including those attached to appellant's field operations department, were engaged in agriculture and came within the agriculture exemption in the Act during each workweek covered by the litigation.

31. Findings that appellant owes various appellees certain specific amounts as overtime compensation under the Fair Labor Standards Act. (R. 193, 195, 197, 201, 204, 206, 208, 210, 212, 216, 218, 220, 223, 226, 231, 235, 239, 243, 248, 256, 257, 258, 263, 265, 273, 276, 278, 283, 284, 286, 288).

These findings are all clearly erroneous because in all workweeks affected by the controversy in this action, said appellees were either not engaged in interstate commerce or in the production of goods for interstate commerce or, if they were so engaged, were exempt from the overtime provisions of the Act under either Section 13(a)(6) or Section 7(c).

32. Finding that certain of the appellees worked in the mill "but not in the operation of processing machinery." (R. 212). This finding was directed particularly at appellees Oato (electrician who also worked in some workweeks in the power plant of the mill (R. 213)), Carrit (fire room employee (R. 216-218)), and S. Robello (power plant employee (R. 218-220)).

This finding is clearly erroneous, because the evidence shows that the fire room and power plant work of said appellees was an integral and necessary part of the appellant's processing operations. (R. 85-94).

33. Finding that "nothing . . . in the activities performed by [appellee Pacheco] was either agricultural, or part of the processing operation at the mill. As a laboratory technician, he was entitled to receive overtime, inasmuch as none of the pleaded exemptions are applicable." (R. 285).

This finding is clearly erroneous because this appellee, who did laboratory work in connection with appellant's field operations, came within the agriculture exemption in the Act in each workweek in controversy as to him.

APPENDIX B.

Brief of American Farm Bureau Federation as Amicus  
Curiae Previously Filed With This Court

IN THE

**United States Court of Appeals**

FOR THE NINTH CIRCUIT.

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No. 11952

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WAIALUA AGRICULTURAL COMPANY, LIMITED,  
A CORPORATION,

*Appellant,*

*vs.*

CIRACO MANEJA, ET AL.,

*Appellees,*

*and*

CIRACO MANEJA, ET AL.,

*Appellants,*

*vs.*

WAIALUA AGRICULTURAL COMPANY, LIMITED,  
A CORPORATION,

*Appellee.*

---

ON APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES  
FOR THE DISTRICT OF HAWAII.

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BRIEF FOR AMERICAN FARM BUREAU FEDERATION AS AMICUS CURIAE.

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## STATEMENT.

On motion duly made, the American Farm Bureau Federation (hereinafter referred to as the Farm Bureau) was granted leave by this court on November 4, 1948, to file a brief as *amicus curiae* herein.

The Farm Bureau is a nonprofit corporation organized under the laws of the State of Illinois. It is a general farm organization of more than 1,250,000 farm families in 45 states of the United States and Puerto Rico.\* The objects of the Farm Bureau are to promote, protect and represent the business, economic, social and educational interests of the farmers of the United States, and generally to develop agriculture. It sought and secured permission to file a brief herein in order to show to this court that the decision below, if sustained, would deprive not only sugar plantations in Hawaii but all farmers in the United States of the agricultural exemption in the Fair Labor Standards Act with respect to many activities which clearly fall within the language and purpose of that exemption.

We shall not review the facts in this case since they have all been stipulated by the parties and are set forth in the brief filed with this court by the appellant, Waialua Agricultural Company, Limited.

As we read the decision (R. 410-437) and judgment (R. 440-445) below, it destroys for American agriculture the very broad and carefully drawn exemption for "agriculture" appearing in sections 13(a)(6) and 3(f) of the Fair Labor Standards Act (hereinafter called the Act). The decision seems to attempt some distinction between mechanized and non-mechanized farming operations and between large and small farming operations. The decision denies the agricultural exemption to the many activities involved in the case which are common everyday activities

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\* The Farm Bureau has never had any membership in Hawaii.



performed by most American farmers and farms. Such activities are: (1) the hauling by the farmer of the farm's products to a storage place or a processing plant located either on or off the farm or to any market; (2) the hauling of fertilizer, seed, other agricultural supplies, and agricultural equipment from one part of the farm to another; (3) the hauling by the farmer of necessary farm supplies and equipment from a nearby town to the farm; (4) the maintenance, repair and operation by the farmer of his trucks and other hauling facilities, including maintenance of field roads on the farm; (5) the repair and overhauling by the farmer or on the farm of farm machinery, equipment and implements; (6) the feeding and shoeing by the farmer or on the farm of horses and mules used on the farm; (7) the maintenance and repair by the farmer or on the farm of farm buildings and grounds and tools and implements used in the farm operation; and (8) the processing by farmers or on the farm of agricultural products grown on the farm preparatory to marketing.

We contend that the above enumerated activities fall squarely within the agricultural exemption provided by the Act. If the decision and judgment below holding otherwise are sustained, then all American agriculture, and not only sugar cane farming, will be substantially deprived of the exemption which the Act grants. We therefore pray that this court reverse the decision and judgment of the court below insofar as it denies exemption to the above enumerated activities.

We shall now show that the language of the exemption provision, its legislative history, the case law and the administrative interpretations of the Administrator of the Wage and Hour Division thereunder unassailably establish that such activities are exempt under section 13(a)(6) of the Act.

## ARGUMENT.

**Employees Engaged in the Aforementioned Activities Are Employed in "Agriculture" Within the Meaning of Section 3(f) and Are Therefore Exempt From the Wage and Hour Provisions of the Act as Provided by Section 13(a)(6).**

*A. The Exemption Is Not Destroyed Because Farm Operations May Be Mechanized.*

As the courts have recognized, the Act in section 3(f) contains a very broad, comprehensive and far reaching definition of the term "agriculture". *Addison v. Holly Hill Fruit Products*, 322 U. S. 607, 612; *Damutz v. Pinchbeck*, 158 F. (2d) 882, 883 (C. C. A. 2); *McComb v. Farmers Reservoir Co.*, 167 F. (2d) 911, 914 (C. C. A. 10). The definition does not distinguish between farming operations that are mechanized and those that are not mechanized, and the courts in the cases above cited have refused to recognize any such distinction. See also *Miller Hatcheries v. Boyer*, 131 F. (2d) 283, 285 (C. C. A. 8). If an employee comes within the statutory definition, he is exempt without qualification, whether his operation is conducted by hand or by extremely complex machinery. For the past 35 years or more there have been great technological advances in American agriculture and the United States Department of Agriculture has encouraged such technological advances. These have taken place in the case of many varieties of farming. *Hopkins, Changing Technology and Employment in Agriculture* (U. S. Department of Agriculture, 1941) p. 53. For example, the labor required on an acre of wheat in 1934-36 was half the amount needed in 1909-13. *Technology on the Farm* (U. S. Department of Agriculture, 1940) p. 61. As part of this trend toward greater productivity, each census since 1880, with few exceptions, has shown an increase in the average size of farms. The most noticeable increases were in the areas best suited to the

use of power equipment. *U. S. Census of Agriculture* (1945) Pt. II, p. 65. Approximately as of the date of enactment of the Fair Labor Standards Act, about 10% of the nation's farms accounted for 54% of the farm produce and 68% of the cash farm wage bill in the United States. Supp. Rep. 1012, Pt. II, Committee on Education and Labor, 79th Cong. 1st Sess., p. 77. The record in the present case demonstrates how these technological advances have taken place in the case of appellant's sugar plantation (R. 215-217).

When Congress enacted the Fair Labor Standards Act in 1938, it was presumably aware of these technological forward strides in agriculture. Had it intended to distinguish in the exemption for agriculture written into the Act between those farms which are not mechanized and those which are, it could quite easily have expressed such intent. It did not do so, but as we shall show, simply defined the term "agriculture" in functional terms. The court below, therefore, was completely in error in denying exemption to the agricultural activities of appellant on the ground that such activities are mechanized. Degree of mechanization is a factor of no relevance.

*B. Section 3(f) Was Intended to Exempt Anything the Farmer Does In Connection With Growing and Marketing His Crop and in Addition Anything that Is Done on the Farm in Connection with Growing and Marketing the Crops of that Farm.*

The definition starts with "farming in all its branches". It then proceeds to enumerate specific activities including preparation of the soil, growing of agricultural commodities, and harvesting of them. Finally the definition includes

"any practices (including any forestry or lumbering operations) performed by a farmer or on a farm as an incident to or in conjunction with such farming

operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market." (Emphasis supplied.)

Language could not be more clear to evince an intent to exempt all activities performed by the farmer or on the farm in connection with growing and marketing the farm's crops.

We consider briefly the terms "farm" and "farmer". Generally speaking the term "farm" means a tract of land or several tracts of land or fields owned or controlled by one or more persons and devoted to the production of agricultural products as a single enterprise under common management with common equipment and labor. Many farms consist of several and sometimes many separate tracts or fields. The operator of the farm has always been designated a "farmer." Most farmers are individuals. However, there are thousands of farming partnerships in the United States and in recent years it has been quite common for joint owners to incorporate rather than to operate as partners. All of such types of farmers are included within the membership of Farm Bureau.

Practically every farm in the United States, whether large or small, and whether it produces livestock, milk or grows grain, forage, crops, seed, cotton, fruits or vegetables, tobacco or any other agricultural commodity, engages in the activities which the court below held non-exempt. Almost all farmers, as part of their harvesting operations, haul their crops to a storage place or a processing plant located either on or off the farm or to some market. A great many of them conduct extensive processing operations upon their own crops. For example, many fruit and vegetable farmers pack and can their own fruits and vegetables; many cotton farmers gin their own cotton; and many dairy farmers process their own milk into butter and cheese. The apple farmer, for example, may haul his apples to a storage place on the farm or he may sort, wrap and pack the apples and otherwise prepare them

for market or he may can the apples in one form or another, or he may haul them to a packing plant off the farm to which he sells them. The grain farmer may haul his grain to a storage place on his farm or to a nearby elevator to which he sells same; the dairy farmer may haul his milk to a bottling plant on his own farm or to a nearby bottling plant to which he sells same, or he may process the fluid milk into butter and cheese on his own farm and then transport the same to market; the cotton farmer may haul his cotton to a gin located on or off the farm, and so forth. Unquestionably, when so performed, these are operations performed by a farmer or on a farm as an incident to or in conjunction with farming operations; *Redlands Foothill Groves v. Jacobs*, 30 F. Supp. 995 (S. D. Calif. 1940); *Damutz v. Pinchbeck*, 159 F. (2d) 882. All farmers likewise haul agricultural supplies and equipment to the particular field or fields of the farm where such supplies and equipment are to be used; all of them go to town with their trucks or other vehicles to pick up supplies and equipment for use on the farm; all do some maintenance work to keep in good usable condition their trucks or other hauling facilities, including the field roads on the farm; all do some repair work on their agricultural equipment, machinery and implements; many feed and shoe their horses and mules; and all do some maintenance and repair work on the farm buildings and grounds, and with tools and implements used in the farming operation. Without some or all of these various activities, no farm could grow or produce anything. Thus the decision below, if sustained, would apply to all farming and would effectively destroy the agricultural exemption for all farms and not only for the Hawaiian sugar plantations.

Furthermore, with respect to the various hauling activities, no distinction can be drawn on the basis of the medium used for such hauling. In some cases as in the case before the court here, the medium used for bringing in the sugar crops to the mill is a narrow gauge railroad,

although it appears from a recent Government report that many other methods of transportation are used on Hawaiian sugar plantations with a general trend toward large motor trucks. *The Economy of Hawaii in 1947*, Bureau of Labor Statistics, U. S. Department of Labor, Bulletin No. 926, p. 45. In the case of a small cotton or tobacco farmer, he may haul his cotton to the cotton gin or his tobacco to a tobacco stemmery by horse-drawn vehicle. In the case of a dairy farmer or a fruit farmer, he may haul his milk or fruit to a bottling plant or to a packing establishment by large truck. In many instances such trucks will be 10-ton or larger in size. We note that in the case at bar the rail cars on the narrow gauge railroad averaged only 4 and 3/4 tons per car gross cane (R. 157). We cannot conceive of any basis upon which the type of vehicle used in the hauling could make any difference in the application of the exemption. As an economic matter the farmer, consistent with his means, will use that mode of transportation best suited for his type of farming. In all cases, however, whatever the medium used, the hauling is simply an inseparable part of the farmer's operations of growing agricultural commodities, harvesting them and marketing them.

It is perfectly plain then that the statutory definition of agriculture when it refers to "farming in all its branches", "harvesting" and "practices . . . performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market", includes the activities listed *supra*, pp. 2, 3.

*C. The Legislative History of Sections 13(a)(6) and 3(f) Confirms that all the Activities Here Described Were Intended to be Exempt.*

As the bill which finally became the Fair Labor Standards Act worked its way through the legislative mill to final passage, repeated assurances were given that a full

exemption had been accorded to all activities performed by the farmer or on the farm in connection with the growing and marketing of the farm's crops. All agreed that the agricultural exemption was to be plenary and that all agriculture without exception was excluded from the coverage of the Act. It is obvious from the legislative history that the bill never would have become law but for such assurances and the consequent feeling on the part of the legislators that *all* agriculture was in fact exempt. 83 Cong. Rec. 7393, 9257.\*

The bill (S. 2475) was introduced in the Senate on May 24, 1937 and was referred to the Senate Committee on Education and Labor, which wrote into the bill a broad definition of "agriculture" and then reported it to the Senate. *S. 2475, as reported in the Senate, July 6, 1937*, Sec. 2, pp. 50-51. Senator Black, Chairman of the Senate Committee in charge of the bill, stated to the Senate that the bill specifically excluded workers in agriculture of all kinds and of all types. 81 Cong. Rec. 7648. When he made this statement the agricultural definition in the bill, insofar as it related to practices incidental to farming operations, limited the exemption to those practices "ordinarily" performed by a farmer as an incident to farming operations.

In various colloquies between Senator Black and other Senators, the former made it clear that the exemption applied to all the things the farmer did with reference to producing his crops and marketing them—whether the crops were cotton, fruits or vegetables, or any other commodity. 81 Cong. Rec. 7657, 7658, 7659. Senator McGill then proposed an amendment which was adopted with the approval of the Labor Committee, which amendment provided that the agricultural exemption should apply not

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\* We are not setting forth any part of the text of the debates as representative portions are contained in Appendix A of the Brief for Appellant (Pages 81 to 87, inclusive).

only to practices ordinarily performed *by a farmer* as an incident to his farming operations, but also to practices ordinarily performed *on a farm* as an incident to such farming operations. His amendment further added to the exemption for agriculture the activity of "delivery to market". The purpose of the McGill amendment, as explained by its author, was to exempt *all* kinds of labor performed on a farm so long as it was "incidental to agricultural purposes" and was merely preparatory to the marketing of *any* field crop and *all* kinds of labor performed in connection with making delivery to market of agricultural products. The discussions on Senator McGill's amendment are abundantly clear that such amendment was intended to apply to any commodity produced on a farm—peanuts, fruits and vegetables, grain, sugar cane, etc. 81 Cong. Rec. 7888, 7927, 7928-7929.

The language added to the agricultural definition by Senator McGill's amendment remained in the bill and was ultimately part of the bill as enacted. No activities are more essentially "incidental to agricultural purposes" than those we are presently discussing. To deny exemption to them as the court below effectively did is to flaunt the clearly expressed legislative purpose.

When the bill as passed by the Senate went to the House of Representatives, the House Labor Committee rewrote the agricultural exemption and purposely struck the word "ordinarily" from that part of the definition relating to incidental practices. H. Rep. No. 1452, 75th Cong., 1st Sess. pp. 4-5, 11. And the word "ordinarily" never again reappeared in the definition. The bill as it was first reported by the House Labor Committee was recommitted to such Committee and on April 21, 1938, another draft of S. 2475 was reported to the House. As so reported, once again the definition of "agriculture" was broadened by adding to the incidental practices portion of the definition the activities of "preparation for



market", "delivery to storage", and "delivery \* \* \* to carriers for transportation to market". H. Rep. No. 2182, 75th Cong. 3rd Sess. p. 2. It was in this form that the bill was passed in the House.

If there had been any doubt theretofore that the hauling by a farmer of his crops to a storage place or to carriers to transport same to market was exempt, such doubt was completely eliminated by the addition of the foregoing phrases to the definition.

The two Houses of Congress then held a conference on the bill. In such conference they retained every amendment that had previously broadened the definition of "agriculture". But they went further. They broadened the exemption still more by exempting *all practices performed by a farmer or on a farm "in conjunction with such farming operations"*. 83 Cong. Rec. 9253-9254. This further broadening is additional confirmation that Congress intended to include in the exemption all of the activities we are discussing, since all of them are obviously performed by the farmer or on the farm *in conjunction with* the farming operations of growing crops. All of them are vital to the growing operation which could not otherwise take place.

When the conference report was debated in the Senate, Senator Thomas of Utah, who had succeeded Senator Black as Chairman of the Senate Committee on Education and Labor, and was chairman of the Senate conferees, stated that agriculture was exempted from the operation of the bill, that he did not know of any kind of agriculture that was included in the bill, and that the definition of agriculture was purposely made all-inclusive. 83 Cong. Rec. 9162-9163.

The legislative history will be searched in vain for any hint that Congress intended by the agricultural exemption to exempt only small farms doing their work with hand labor. On the contrary, there was discussion concerning

many highly mechanized operations and it was made plain by the proponents of the legislation that such operations would be exempt if they came within the definition. 81 Cong. Rec. 7656, 7657, 7658, 7659. Farm operations, unlike industrial operations, cannot be regulated by the clock. The coming and going of the seasons do not await the pleasure of man. Sunshine, rain, humidity and warmth are not yet subject to man's control. The time to plant and the time to harvest are determined by the whims of nature. Plant and animal growth continues around the clock. Successful farming demands long hours of labor on certain days and little or no hours of labor on others. Frost, heat, humidity, rainfall, relative day and night temperature, presence or absence of pests are the practical factors governing these demands. No limitation or regulation of the farmer's hours is possible in an efficient farming operation. This is the underlying reason for the agricultural exemption. See the testimony of various witnesses at the Joint Hearings on S. 2475 and H.R. 7200 (the related House bill) held in June, 1937, Pt. 3, 81 Congressional Record, pp. 1007, 1083, 1120-1121, 1133-1134. Senator McAdoo speaking on the floor of the Senate in support of an amendment to the definition of agriculture which would have exempted "any practices ordinarily performed by or for a farmer as an incident to such farming, including harvesting, packing, storing, or preparing for market, in the raw or natural state, any products derived from any of the above agricultural pursuits", stated the proposition thusly:

"These agricultural commodities are highly perishable, and the work which must be done by the packing houses and on the farms varies greatly with temperature variations. Twenty-four hours in advance one cannot know whether the crop must be moved. So, to fix rigid hours of labor in such cases would be to ruin the producers, as the crop must be handled quickly with the workers available. The broadening of the definition as I have suggested is not only directly in

line with the object of the bill but will also protect the farmers, who, in my State at least, are engaged in a method of marketing, packing, and handling their crops which may differ from the methods employed in other States." (8 Cong. Rec. 7927.)

Whether or not the farmer's operations are mechanized, the farmer must do his work when he can, depending upon natural factors. Consequently, the imposition of overtime requirements upon the farmer would not fulfill the purpose of the Act to induce employers to reduce hours of work and employ more men. See *Walling v. Youngerman Reynolds Hardwood Co.*, 325 U. S. 419, 423-424, and cases there cited. It would simply impose additional costs and other obligations upon the farmer without the beneficent results which Congress found would flow from the imposition of overtime requirements upon industry. Hence, Congress granted a complete exemption to all agriculture regardless of the mechanized character of the operation. The court below in its decision has ignored this Congressional purpose.

*D. No Court Other Than the Court Below Has Denied Exemption to the Activities in Question.*

The judicial decisions under the Fair Labor Standards Act fully support our position that the activities listed *supra*, pp. 2, 3, come within the agricultural exemption provided by the Act, and that it is irrelevant whether or not the farming operations are large or small, manual or mechanized. In addition to the cases cited on pages 4 and 7, *supra*, and those cited in the appellant's brief at pages 40-47, the court's attention is drawn to the following cases where the exemption was held applicable: *Jordan v. Stark Brothers Nurseries* (W.D. Ark. 1942), 6 Labor Cases ¶61,468 (employees of a nursery engaged in transporting trees from the fields where they were grown to a packing shed of the employer where they were sorted,

graded, and tied into bunches for shipment); *Walling v. Craig*, 53 F. Supp. 479, 483 (D. Minn. 1943) (repair and reconditioning of bulldozers, tractors, and trucks devoted to agricultural activities); *Walling v. Peacock Corp.*, 58 F. Supp. 880, 883 (E. D. Wisc. 1943) (handling and milling of onion sets by the employees of an employer who grows the onion sets); *Redlands Foothill Groves v. Jacobs*, 30 F. Supp. 995, 1006 (S. D. Calif. 1940) (packing by farmer of fruit he grows himself or bottling by a farmer of honey gathered on his farm); *Dye v. McIntyre Floral Co.*, 176 Tenn. 527, 144 S. W. (2d) 752 (1940) (employees of a nursery, who receive, care for, and prepare for shipment nursery products grown by the nursery or purchased from others); *Belt v. Hodges*, (N. D. Tex., 1941) 4 Labor Cases ¶60,664 (employee working for a farm implement dealer trading farm implements for livestock).

*E. The Administrator of the Wage and Hour Division Has Consistently Held All of the Activities in Question to be Exempt Under Section 13(a)(6).*

1. HAULING OF FARM'S PRODUCTS TO A STORAGE PLACE OR A PROCESSING PLANT LOCATED EITHER ON OR OFF THE FARM OR TO ANY MARKET.

(i) In *Interpretative Bulletin* No. 14, issued in August, 1939, 3 *C. C. H. Labor Law Reporter* (4th ed.) ¶24,488, the Administrator construing the agricultural exemption stated:

"If a company has sugar cane fields and also a mill, the transportation of its own sugar cane to the mill seems an incidental practice which is included in this term" i.e. "practices \* \* \* performed by a farmer \* \* \* as an incident to or in conjunction with such farming operations". ¶10(f).

(ii) In an opinion letter written by him, the Administrator expressed the view that employees of an alfalfa

grower, who haul the alfalfa grown by that grower to a processing plant located off the farm, are exempt under section 13(a) (6). WHMan. (1944-45) p. 594.

(iii) In paragraph 5(a) of *Bulletin* 14, the Administrator stated that the term "harvesting of any agricultural or horticultural commodities", as used in section 3(f), includes all "operations customarily performed in connection with the removal of the crops by the farmer from their growing position in the field, greenhouse, etc."

(iv) In paragraph 10(c) of the *Bulletin*, the Administrator stated as follows with respect to the term "delivery to storage" appearing in the definition of "agriculture":

"The term 'delivery to storage' includes taking the commodities, dairy products, . . . to the places where they are to be stored or held pending preparation for or delivery to market".

(v) In paragraph 10(d) of the *Bulletin*, the Administrator stated as follows with respect to the term "delivery . . . to market" appearing in the definition of "agriculture":

"The term 'delivery . . . to market' includes taking the commodities, dairy products . . . to market".

(vi) In paragraph 10(e) of the *Bulletin*, the Administrator stated as follows with respect to the term "delivery \* \* \* to carriers for transportation to market" appearing in the definition of "agriculture":

"The term 'delivery . . . to carriers for transportation to market' includes taking the commodities, dairy products . . . to a carrier—truck, railroad, ship, etc.—for transportation by such carrier to market".

(vii) In paragraph 10(f) of the *Bulletin*, the Administrator stated that besides the practices listed in the statute as being incident to or in conjunction with farming operations, there are other practices included within the exemp-

tion. As one such practice he mentioned the actual selling of the agricultural or horticultural commodities, etc.

All of the foregoing opinions relate to hauling and marketing activities performed by the farmer. The Administrator, however, has also recognized that if hauling activities are confined to a particular farm and consist of hauling on that farm the crops grown thereon to a storage place or processing plant located on that farm, the agricultural exemption also applies to such hauling activities. Thus in paragraph 11 of his *Bulletin* No. 14, he dealt with the term "practices . . . performed . . . on a farm as an incident to or in conjunction with such farming operations" appearing in the definition of "agriculture". He stated that with the exception of "delivery to market", which necessarily involves working off the farm, the practices described in paragraph 10 of his *Bulletin*, even if performed by employees of someone other than the farmer, would be exempt so long as they were performed on the farm. And as we have already seen, among the practices he described in paragraph 10 of his *Bulletin* were those of hauling crops to a storage place, processing plant or a carrier for transportation to market.

## 2. HAULING BY THE FARMER OF NECESSARY FARM SUPPLIES AND EQUIPMENT FROM A NEARBY TOWN TO THE FARM.

In paragraph 10(f) of his *Bulletin* No. 14, the Administrator stated:

"The truck drivers working for a farmer, who haul garbage and feed to the farm for feeding pigs, also perform practices that are exempt."

This example shows plainly that in the Administrator's view the hauling by the farmer's employees of agricultural supplies and equipment to the farm for use in the farming operations is exempt.

### 3. OPERATIONS FUNCTIONALLY NECESSARY TO FARMING PERFORMED BY THE FARMER OR ON THE FARM.

Included among such operations are the hauling of fertilizer, seed, other agricultural supplies and agricultural equipment from one part of the farm to another; repair and maintenance by the farmer or on the farm of the farmer's hauling facilities, including field roads on the farm; repair by the farmer or on the farm of farm machinery, equipment and implements; feeding and shoeing by the farmer or on the farm of horses and mules used in the farm operations; and maintenance and repair by the farmer or on the farm of farm buildings and grounds and tools and implements used in the farming operation.

In paragraph 12 of *Interpretative Bulletin* No. 14, the Administrator said as follows:

"We have received inquiries concerning office help—secretaries, clerks, bookkeepers, etc.—night watchmen, maintenance workers, engineers, etc., who are employed by a farmer or on a farm in connection with the activities described in the definition of 'agriculture' contained in section 3(f). In our opinion such employees are exempt."

It is clear from this statement that the employees engaged in the above activities, all of which are not only performed in connection with the production and growing of agricultural commodities but are indispensable to such production and growing, are in the Administrator's opinion exempt.

In addition to the opinion expressed in paragraph 12 of his *Bulletin* No. 14, the Administrator and his attorneys have expressed other opinions showing that any activities performed by the farmer or on the farm in connection with the growing and marketing of the farm's crops are exempt. Thus they have held the following activities to come within the agricultural exemption.

(i) The erection of a silo on a farm by employees of an independent contractor. *Interpretative Bulletin* No. 14, par. 11.

(ii) The removal of stumps by employees of an independent contractor from cut over timber land owned by a lumber company and now devoted by the lumber company to the growing of tung trees, where such removal and the plowing and fertilizing of the ground around the tung trees was necessary to the proper growth of the trees. WHMan. (1944-45) p. 592.

(iii) Sorting, grading, sizing and other practices performed on tobacco on the farm where grown by a company in the business of buying, warehousing and marketing tobacco, to which the farmer sells his tobacco. WHMan. (1944-45) p. 593.

(iv) Work on the farm by field men of a cannery to which the farmer had contracted to sell his crops, notwithstanding such field men from time to time report to the canning plant. 3 *C. C. H. Labor Law Reporter* (4th ed.) par. 25,242.203.

(v) Pre-cooling operations on the farm with respect to fruits and vegetables grown on the farm. 3 *C. C. H. Labor Law Reporter* (4th ed.) par. 25,242.21.

(vi) Logging operations performed by the farmer or on his farm with respect to timber blown down in a hurricane, which fallen timber presented a fire hazard and an impediment to the cultivation of the land. 3 *C. C. H. Labor Law Reporter* (4th ed.) par. 25,242.252.

(vii) Vining of peas grown on a farm by a vinery located thereon. 3 *C. C. H. Labor Law Reporter* (4th ed.) par. 25,242.281.

(viii) Tobacco stemming by a farmer or on a farm. 3 *C. C. H. Labor Law Reporter* (4th ed.) par. 25,242.344.



#### 4. PREPARATION FOR MARKET OF PRODUCTS GROWN ON THE FARM.

In paragraph 10(b) of *Bulletin* No. 14 the Administrator stated:

“(b) The term ‘preparation for market’ must be treated differently with respect to various commodities. The following activities, among others, when performed by a farmer, seem to be included within the term:

1. Grain, seed, and forage crops.—Weighing, binning, stocking, cleaning, grading, shelling, sorting, packing and storing.

2. Fruits and vegetables.—Assembling, binning, ripening, cleaning, grading, sorting, drying, preserving, packing, storing, and canning.

3. Nuts (pecans, walnuts, peanuts, etc.).—Grading, cracking, shelling, cleaning, sorting, packing, and storing, unshelled nuts; and performing the same operations except cracking and shelling, upon the nut meats.

4. Sugar.—Manufacturing raw sugar, cane, or maple syrup and molasses.

5. Eggs.—Handling, cooling, grading, and packing.

6. Wool.—Grading and packing.

7. Dairy products.—Salting, printing, wrapping, packing, and storing butter; ripening, molding, wrapping, packing, and storing cheese; and canning or packing any other dairy product.

8. Cotton.—Weighing, ginning, and storing cotton; hulling, delinting, cleaning, sacking, and storing cottonseed.

9. Nursery stock.—Handling, wrapping, packaging, and grading.

10. Tobacco.—Handling, drying, bulking, stripping, tying, sorting, stemming, packing, and storing.

11. Livestock.—Handling and loading.

12. Poultry.—Culling, grading, cooping, and loading.

13. Honey.—Assembling, extracting, heating, ripening, removing comb, straining, cleaning, grading, weighing, blending, packing, and storing.

14. Fur.—Removing the pelt, scraping, drying, putting on boards and packing.”

5. AMERICAN FARMERS HAVE RELIED UPON THE INTERPRETATIONS OF THE ADMINISTRATOR IN REGARDING THEIR VARIOUS FARM ACTIVITIES AS EXEMPT.

According to a press release issued by the Administrator at the same time as Interpretative Bulletin No. 14, the Administrator's interpretations of the agricultural exemption in the Act were made only after lengthy conferences with representatives of employers, employees and other interested parties. Authorities of the United States Department of Agriculture were also consulted. Much time was devoted by the Administrator's attorneys to a study of the legislative history of Section 13(a)(6). The Administrator also had his economists make economic studies in order to assist in a proper determination of the scope of the exemption. It was only after these lengthy investigations and discussions that the Administrator announced his opinions on the subject. Such opinions were widely circulated through *Interpretative Bulletin* No. 14, press releases and other releases to the various labor law publications.

Once the Administrator's interpretations were announced, the farmers of America relied upon such interpretations and were guided by them in compensating their employees. And such interpretations as above set forth were never modified. Since they comport with the language and spirit of the exemption provisions they should be accorded the respect which the Supreme Court has said are due the Administrator's interpretations. *United States v. American Trucking Ass'n. Inc.*, 310 U. S. 534, 549. As the Supreme Court has also said, employers may properly resort to such interpretations for guidance.

*Skidmore v. Swift*, 323 U. S. 134, 140. They should not be lightly discarded, as was done by the court below, in favor of wholly new interpretations, of which the farmer never before heard.

*F. The Imposition of the Wage and Hour Requirements of the Act with Respect to the Activities in Question Would Create a Huge Retroactive Liability for the American Farmer.*

Since the language and purpose of the agricultural exemption in the Act appear clearly to grant exemption from the wage and hour requirements thereof to the activities in question, and since the courts and the Administrator have consistently indicated that such activities are exempt, the American farmer has naturally assumed that they are in fact exempt. If now, ten years after the Act has gone into effect, he is to find that contrary to all indications many of his activities are not entitled to exemption, the retroactive liability to employees, if susceptible of measurement, could be enormous. The relationship between farmer employer and farm employee is more than an arrangement of employment, it is also a social arrangement. Farming is a way of life. Usually the farm employee (and often his family with him) lives upon the farm. Often he has the privilege of producing on the farm commodities for his own consumption as well as other privileges. His interest in the farm cannot be limited to some eight, nine or ten hours each day. On most days there is no way to measure the number of hours the farm employee has devoted respectively to his employer's interests and to his personal interests. There is in most operation no satisfactory basis for the keeping of time records. Farm employees are actually on the farm available for work many hours. If the Fair Labor Standards Act is now to be construed so that agriculture will not be

exempt the retroactive liability to employees could be so measured as to mean bankruptcy to a large number of farmers.

### Conclusion

For the foregoing reasons, the farm activities described herein should be held exempt under the definition of "agriculture" in the Fair Labor Standards Act.

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## APPENDIX C.

## Legislative History of Secs. 13(a)(6) and 3(f).

1. *Senator Black's statement opening debate in the Senate on S. 2475.*

"We have placed together in the bill definitions of agricultural work which have been fixed from time to time in other legislative enactments, and in addition to that we have drawn liberally from Mr. Webster's definition of agriculture." 81 Cong. Rec. 7648.

2. *Statement of Senator Schwellenbach that packing by a farmer of his own grown apples was exempt under the bill.*

"When an apple grower picks his apples and takes them into his own warehouse . . . and in that warehouse packages them and then stores them, or perhaps first stores them and then packages them, the work being done by the farmer on his own farm, there is *no dispute about the fact that it is an agricultural operation.* . . . It seems to me that the bill, under the definitions as they now stand, places at a considerable disadvantage the man who is too small an operator to perform these operations upon his own farm. . . . The picking of the apples is an agricultural process. If the man does it on his own ranch, the storing of the apples and the washing of the apples and the packing of the apples are all agricultural processes" [Emphasis supplied] 81 Cong. Rec. 7659. To get at the situation about which he was complaining, Senator Schwellenbach later introduced an amendment to provide an exemption for persons employed within the area of production "in preparing, packing, or storing . . . fresh fruits or vegetables in their raw or natural state" (*Id.*, p. 7876). This amendment was adopted (*Id.*, p. 7949).

3. *Debate in Senate on processing of sugar cane.*

"Mr. Overton. Let me invite the attention of the Senator to another agricultural industry in connection

with which the processing, if it may be so called, by the farmer of his own product is much more general than in the case of the farmer ginning his own cotton. I refer to the sirup-cane producer who processes his own cane, grinds it, and makes it into sirup. Does he come within the provisions of the bill?

\* \* \* \* \*

"Mr. Black. The Senator can read the definition in *the bill and note that those things ordinarily done by farmers on the farm do not come under the provisions of the bill.*

"Mr. Pepper. Mr. President, I wonder if the following language would not answer the questions of the Senator from Louisiana. It is found on page 51 of the bill, lines 13 and 14, being a part of the agricultural definition: 'And any practices ordinarily performed by a farmer as an incident to such farming operations.'

"Mr. Overton. It may and it may not. I was asking the Senator from Alabama because he is the author of the bill, and I was giving a concrete case . . . I have taken the case of a farmer who *plants his sugarcane, gathers it, and who on his own farm has a sirup mill and converts the juice of the cane into sirup. Does he come within the provisions of the bill?*

"Mr. Black. *The definition provides that those things done by the farmer ordinarily on his farm constitute a part of his farming business. It would depend upon whether or not that was an ordinary incident to that type of farming business in the State where sirup is made. If so, that would be agriculture under the definition of the bill.*

\* \* \* \* \*

"Mr. Overton. It would not be considered an ordinary practice performed by a farmer as an incident to his farming operations for the reason that we also have large sirup mills. Such sirup mills gather in the cane produced by the different farmers and process it into sirup. But it is of frequent occurrence that a farmer has a mill on his own farm and converts his own cane juice into sirup. With that explanation,

would the Senator say the practice of such a farmer is one ordinarily performed by a farmer as an incident to his farming operations?

"Mr. Black. If the Senator says it is a practice not ordinarily performed by a farmer as incident to his farming operations, I would necessarily say it was a practice not ordinarily performed by a farmer as incident to his farming operations, and therefore would not come under the definition. I am assuming it is a practice which is not ordinarily engaged in, by farmers.

"Mr. Overton. Not altogether engaged in, but frequently engaged in by farmers.

"Mr. Black. For instance, a farmer might build on his farm a factory for the purpose of manufacturing shirts and sending them through the United States. Since that is a practice not ordinarily engaged in by farmers on their farms, naturally that would not be considered a farming activity.

"Mr. Overton. *Let us take the sugar manufacturer. On some plantations there are mills in which the planters may manufacture their own cane into sugar. Would they come within the provision of the bill?*

"Mr. Black. *As I said, it would depend upon whether or not that comes within the definition under the facts of operation, whether it is a necessary incident to that type of cane farming . . .*

\* \* \* \* \*

"Mr. Overton. As I understand the Senator, in cases where some farmers process their own products and other farmers carry their products to some processor to be processed, then by reason of the fact that some farmers carry their products to a processor to be processed, the farmers who process their own products would not be considered as engaging in a practice which is ordinarily incident to farming operations.

"Mr. Black. I could not say as to that. It depends altogether on the facts as to what is a necessary incident to farming. As I said, there are some things so far removed from farming that all of us would know instantly they did not constitute a farming operation.

The illustration I gave was of a farmer erecting on his farm a factory and manufacturing anything you please, whether something he grows or not, who employs many people to manufacture it, and then ships it in interstate commerce. The mere fact that he has such a plant on his farm would not make the manufacturing of shirts, for instance, a farming operation. It would still be a manufacturing operation. The same reasoning would apply to any other process of manufacturing" [Emphasis supplied]. 81 Cong. Rec. 7657-7658.

4. *Debate on Senator McGill's amendment to provide that the agricultural exemption should apply (1) to practices performed on a farm as an incident to farming operations and (2) to "delivery to market."*

"Mr. McGill. Mr. President, the purpose of the amendment is to broaden the definition of 'employee' as applied to agriculture. I can readily see how some have construed the language of the bill to mean that one who operates a thrashing [sic] machine outfit and employs a crew and is employed by a farmer to thrash [sic] his wheat might be included under the provisions of the bill. *Likewise, those who are engaged in harvesting and delivering to market might be included.* It is my understanding, although no definite commitment has been made, that the amendment is not opposed by those in charge of the bill. If I am correct, I should like to have the amendment agreed to.

\* \* \* \* \*

"Mr. George. Is it the purpose of the amendment to exempt those who thresh grain?

"Mr. McGill. Those who thresh grain, who harvest grain and *deliver it to market.*

"Mr. George. Would the amendment also *apply to the harvesting of any other crop?*

"Mr. McGill. *It would apply to any commodity produced on a farm.*

"Mr. George. Would it apply to peanut pickers who pick in the fields?

"Mr. McGill. Yes.



"Mr. George. *And who move peanuts to the market?*

"Mr. McGill. *Yes; that is my understanding.*

"Mr. George. I should like to ask the Senator from Alabama if that is his interpretation of the amendment.

"Mr. Black. *That is my interpretation of the amendment*, and is it my belief that the bill as originally drawn covers what is now contained in the language of the amendment; but some Senators who were doubtful about it wished to draw a clarifying amendment.

"Mr. George. I am sure it does not in fact do so, because the picking of peanuts and the harvesting of grain in my part of the country are done purely by contract with outsiders, who in a great many cases have no farm interest. What I want to get at is whether, in the opinion of the Senator from Alabama, the language of the amendment of the Senator from Kansas includes any field crop that is threshed, as in the case of grain, or picked, as in the case of peanuts in the field.

"Mr. Black. *Unquestionably.*

"Mr. McGill. I may say to the Senator from Georgia and other Senators that it is my object to make the language of the amendment broad enough to include all work done on a farm, *so long as it is incidental to agricultural purposes.*

"Mr. George. *And so long as it is merely preparatory and necessarily preparatory to the marketing of the field crop.* Is that true?

"Mr. McGill. *That is true; and the language would also include all labor performed in making delivery to market.*

"Mr. George. I thank the Senator.

"Mr. Copeland. Of course, that would take care of my apple man, about whom I have been worrying, would it not? *It would take care of the farmer who takes his crop of apples to the market, would it not?*

"Mr. McGill. That is correct. [Emphasis supplied].  
81 Cong. Rec. 7888.

5. *Debate on amendment proposed by Senator McAdoo.*

Senator McAdoo proposed an amendment, substituting for the language in the definition of agriculture relating to practices ordinarily performed in connection with farming operations, the following:

"Any practices ordinarily performed by or for a farmer as an incident to such farming, including harvesting, packing, storing, or preparing for market, in the raw or natural state, any products derived from any of the above agricultural pursuits." 81 Cong. Rec. 7927.

The following discussion ensued:

"Mr. McGill. Yesterday afternoon the Senate amended the lines to which the Senator's amendment applies by inserting in line 13, after the word 'farmer,' the words 'or on a farm,' and also by inserting in line 14, after the word 'operations,' the words 'including delivery to market,' *it being the purpose of these amendments to exclude from the bill all labor performed on a farm, whether by contract with the farmer or otherwise, and to exclude all labor connected with the delivery to market of commodities produced on a farm.* . . .

\* \* \* \* \*

". . . I will state that I feel the amendment adopted yesterday is broader than the amendment proposed by the Senator from California, by virtue of the fact that no limitation was placed in the amendment adopted yesterday, such as mentioning harvesting, packing, and operations of that character. *The amendment adopted yesterday was intended to include, and, I think, it does include, all kinds of labor performed on a farm and all kinds of labor in connection with delivering agricultural products to market.* In my judgment it includes more than does the amendment proposed by the Senator from California and is broader in its terms. I hope that the amendment adopted yesterday will remain in the bill and that the amendment of the Senator from California, by virtue

of the narrower terms carried in it, will be rejected.

"Mr. George. I suggest to the Senator from California that, in my opinion the amendment offered by the Senator from Kansas [Mr. McGill] yesterday is broader than his amendment, because it takes care of all operations, whether performed by cooperatives or by persons under contract or by persons who have merely been employed for a particular job. To enumerate even them in a succeeding clause, or to recite the things that are included, would thus, of course, under the well-known rule of construction, form a limitation upon what is first stated as a broad general proposition. I think the Senator's purpose is absolutely accomplished by the amendment offered yesterday by the Senator from Kansas.

"I may say to the Senator from California that I had in mind precisely what he has in mind, but with reference to different products. After examining the amendment of the Senator from Kansas I concluded that it covered all those cases as well as the cases which I think the Senator himself has in mind" [Emphasis supplied]. *Id.*, pp. 7927, 7928-7929.

#### 6. *Debate on Conference Report between Senator Thomas and Senator Johnson.*

"Mr. Johnson of California. *I take it from what the Senator has said that the agricultural exemptions are practically plenary, and take in almost all agricultural products.*

"Mr. Thomas of Utah. I could not hear part of the Senator's sentence.

"Mr. Johnson of California. *I said that, in general language, agriculture is exempted from the operation of the bill.*

"Mr. Thomas of Utah. *It is.*

"Mr. Johnson of California. *Does the Senator know of any particular kind of agriculture that is included in the bill?*

"Mr. Thomas of Utah. *I do not know of any. The definition seems to be all-inclusive, and we tried to make it so*" [Emphasis supplied]. 83 Cong. Rec. 9162-9163.

## APPENDIX D.

**Administrator's Interpretations of Section 7(c).**

1. *Distinction drawn between Sec. 7(c) exemptions referring to an entire industry and Sec. 7(c) exemptions referring to particular operations in an industry.*

"The exemption thus granted to cottonseed processing differs from that granted in the same section of the Act to certain operations upon livestock. The latter exemption appears limited to certain particular operations, since Sec. 7(c) does not use any term descriptive of the meat packing industry, but uses only words describing certain particular operations in such industry. With this distinction in mind *it appears to us that all employees working in a plant engaged in processing cottonseed are within the exemption*, while this would not be true of all employees working in a plant engaged in handling, slaughtering or dressing livestock. In the latter case only the employees engaged in the enumerated operations or in operations that are an integral part thereof would be exempt" [Emphasis supplied]. Opinion Letter of Administrator written on July 9, 1941, set forth with approval in *Abram v. San Joaquin Cotton Oil Company*, 49 F. Supp. 393, 401 (S.D. Calif. 1943).

2. *Paragraphs 18 and 22 of Interpretative Bulletin No. 14.*

"... The term 'raw sugar' describes the product of the first processing of sugar cane, which product normally is thereafter refined before it is consumed. The processing of sugar cane into raw sugar is within the exemption; ... " ¶18.

\* \* \* \* \*

"... truck drivers who carry raw materials to the establishment or who transport goods upon which the exempt operation has been performed may be considered as working in the 'place of employment', for they make regularly recurring trips to and from the establishment and may be deemed attached thereto.

Further, some of their work, such as loading and unloading, takes place in the establishment. . . ." ¶22.

3. *Interpretations as to which employees of a processor are exempt under Section 7(c).*

"When an establishment is *exclusively* engaged in performing operations specifically mentioned in Sec. 7(c), every employee working in such a plant either will be actually engaged in the described operations, or else will be engaged in an occupation which is a necessary incident to the described operations and working solely in a portion of the premises devoted by his employer to such operations. *Therefore, when an establishment is exclusively engaged in activities enumerated in the section, all of the employees of the operator of the establishment who work solely in that establishment, including office employees, watchmen, maintenance workers and warehousemen, come within the scope of these exemptions. In such a situation, the exemptions also apply to those employees of the plant operator whose duties consist of hauling agricultural commodities from the fields or from receiving stations to the plant for packing or processing, and to those who transport to market or to carriers for transportation to market goods upon which exempt operations have been performed in the plant*" [Emphasis supplied]. WHM 35:551.

\* \* \* \* \*

"Where an establishment is solely engaged in the canning of fresh fruits and vegetables, the labeling, stamping and boxing of the canned goods during the active season by employees of the canner *are exempt operations if performed in the cannery or in a warehouse located on the same premises as the cannery.*

On the other hand, activities performed in a warehouse located on premises separate from the cannery, are not conducted in the place of employment where the canning is done, and the exemption is inapplicable to all of the employees working in such a warehouse" [Emphasis supplied]. *Id.*, p. 553.

\* \* \* \* \*

“... where an establishment is *solely* engaged in the packing of fresh fruits or vegetables and refrigerator cars are spotted on tracks adjoining the plant, the employees of the packer engaged in bunker icing or in cooling cars solely for use in shipping fresh fruits and vegetables packed in that establishment are exempt” [Emphasis supplied]. *Id.*, p. 554.

\* \* \* \* \*

“If the plant is used *solely* to pack fresh fruits and vegetables, the assembling of box shooks by employees of the packer is exempt when performed during the active season *solely in the packing plant or in a warehouse located on the same premises*” [Emphasis supplied]. *Id.*

\* \* \* \* \*

“At present, if an establishment is engaged exclusively in the operations exempted under section 7(c), generally speaking all employees employed in that establishment are exempt from the overtime provisions of the act for either the entire year or 14 weeks a year, depending on the particular activities involved. This includes office, custodial and maintenance employees.” Statement of Secretary of Labor Schwollenbach submitted to Senate Committee on Labor and Public Welfare. *Hearings on S. 2386 and other bills*, 80th Cong. 2nd Sess., p. 183.

\* \* \* \* \*

An Opinion of the Wage-Hour Division, dated March 18, 1941, held that the Sec. 7(c) exemption applied to field men employed by canneries to supervise the production and harvesting of raw products purchased under acreage contracts. These men, like employees transporting cane to the mill in the instant case, spend most of their time in the fields but they make the cannery their headquarters and make regularly recurring trips to and from the cannery. The Division held that they should be considered as working in the “place of employment”. 3 C. C. H. Labor Law Reporter, ¶25,250.255. Another Opinion Letter, dated March 18, 1941, held that the Sec. 7(c) exemption applies to pea vining stations if the work per-

formed at the vineries and the cannery, to which vined peas are thereafter removed, is performed as part of a continuous series of operations throughout which the peas remain perishable. 3 C. C. H. Labor Law Reporter ¶25,250.32.

\* \* \* \* \*

In the Administrator's press release answering certain questions about the application of the Sec. 7(c) exemption to canneries, he pointed out that a truck driver engaged solely in transporting canned citrus from a cannery to market was within the exemption and must be regarded as employed in those portions of the establishment devoted by the employer to the operations described in Sec. 7(c), i.e. the canning of fresh fruits and vegetables. WHM 35:763

\* \* \* \* \*

An opinion of one of the Administrator's attorneys, appearing in WHM 35:772, declared that the Sec. 7(c) exemption for processing cottonseed applied not only to the oil mill in which the cottonseed was crushed but also to a storage house, in which hulls removed from the cottonseed and cottonseed meal were stored.

## APPENDIX E

**Administrator's Allowance of Tolerance of Non-Exempt Work in the Case of Most Exemption Provisions in the Act.**

In the case of the following exemptions, the Administrator has allowed the indicated percentage of non-exempt work in a workweek without loss of the exemption:

Sec. 13(a)(1) exemption for executives, administrative employees, professionals, local retailing capacity employees and outside salesmen—20%.<sup>1</sup>

Sec. 13(a)(2) exemption for retail establishments—25%.<sup>2</sup>

Sec. 13(a)(3) [now Sec. 13(a)(14)] exemption for seamen—20%.<sup>3</sup>

Sec. 13(a)(4) [now Sec. 13(b)(3)] exemption for carriers by air—20%.<sup>4</sup>

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<sup>1</sup> Regulations, Pt. 541, Subpart A, Title 29, Ch. V. Code of Fed. Reg. (14 F.R. 7705) §§ 541.1(e), 541.2(d), 541.3(d), 541.4(b) and 541.5(b); 3 C.C.H. Labor Law Reporter ¶¶ 23,301.01(e), 23,301.02(d), 23,301.03(d), 23,301.04(b), 23,301.05(b); WHM 20:3-5. See too *Knight v. Mantel*, 135 F. (2d) 514, 517-518 (C.C.A. 8), *Bender v. Crucible Steel*, 71 F. Supp. 420, 425 (W.D. Pa. 1947), both of which applied the 20% test. See also *Walling v. General Industries*, 330 U.S. 545, 547; *Atkinson Co. v. Lassiter*, 162 F. (2d) 774, 777 (C.C.A. 9), judgment vacated on other grounds, 166 F. (2d) 144; and *Helliwell v. Haberman*, 140 F. (2d) 833, 834 (C.C.A. 2) which seem to approve the 20% test.

<sup>2</sup> As explained, *supra* p. 77, footnote 48, the 1949 amendments specifically wrote the 25% test into the law for retail establishments. The tolerance referred to in the text was that permitted by the Administrator prior to such amendments.

<sup>3</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 783 (13 F.R. 1376, 14 F.R. 3678), § 783.4; 3 C.C.H. Labor Law Reporter ¶ 24,109.50; WHM 15:547.

<sup>4</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 786, Subpart A (13 F.R. 1376) § 786.1; 3 C.C.H. Labor Law Reporter ¶ 24,112.01; WHM 15:15.



Sec. 13(a)(5) fishery exemption—20%.<sup>5</sup>

Sec. 13(a)(8) exemption for local newspapers—49.999%.<sup>6</sup>

Sec. 13(a)(9) exemption for street, suburban, etc. railways and local trolley and motor bus operators—20%.<sup>7</sup>

Sec. 13(a)(11) exemption for switchboard operators—20%.<sup>8</sup>

Sec. 13(a)(15) exemption for forestry or logging operations in which not more than 12 employees are employed—20%.<sup>9</sup>

Sec. 13(b)(2) exemption for employees of employers subject to Pt. I of the Interstate Commerce Act—20%.<sup>10</sup>

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<sup>5</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 784 (13 F.R. 1376) § 784.1; 3 C.C.H. Labor Law Reporter ¶ 24,110.01; WHM 15:82.

<sup>6</sup> 3 C.C.H. Labor Law Reporter ¶¶ 25,260.05 and 25,260.34; WHM 15:313. The 49.999% test was also applied in *Robinson v. North Arkansas Printing Co.*, 71 F. Supp. 921, 923 (W.D. Ark. 1947).

<sup>7</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 786, Subpart B (13 F.R. 1376) § 786.50; 3 C.C.H. Labor Law Reporter ¶ 24,112.50; WHM 15:147.

<sup>8</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 786, Subpart C (13 F.R. 1376) § 786.100; 3 C.C.H. Labor Law Reporter ¶ 24,112.100; WHM 15:687.

<sup>9</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 788, § 788.7; 3 C.C.H. Labor Law Reporter ¶ 24,114.07; WHM 15:110.

<sup>10</sup> Title 29, Ch. V, Code of Fed. Reg., Pt. 786, Subpart D (13 F.R. 1376) § 786.150; 3 C.C.H. Labor Law Reporter ¶ 24,112.150; WHM 15:345.

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**In the United States Court of Appeals  
for the Ninth Circuit**

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**WAIALUA AGRICULTURAL COMPANY, LIMITED, A  
CORPORATION, APPELLANT**

*v.*

**CIRACO MANEJA, ET AL., APPELLEES**

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**APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES  
FOR THE DISTRICT OF HAWAII**

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**BRIEF FOR THE SECRETARY OF LABOR, UNITED STATES  
DEPARTMENT OF LABOR, AS AMICUS CURIAE**

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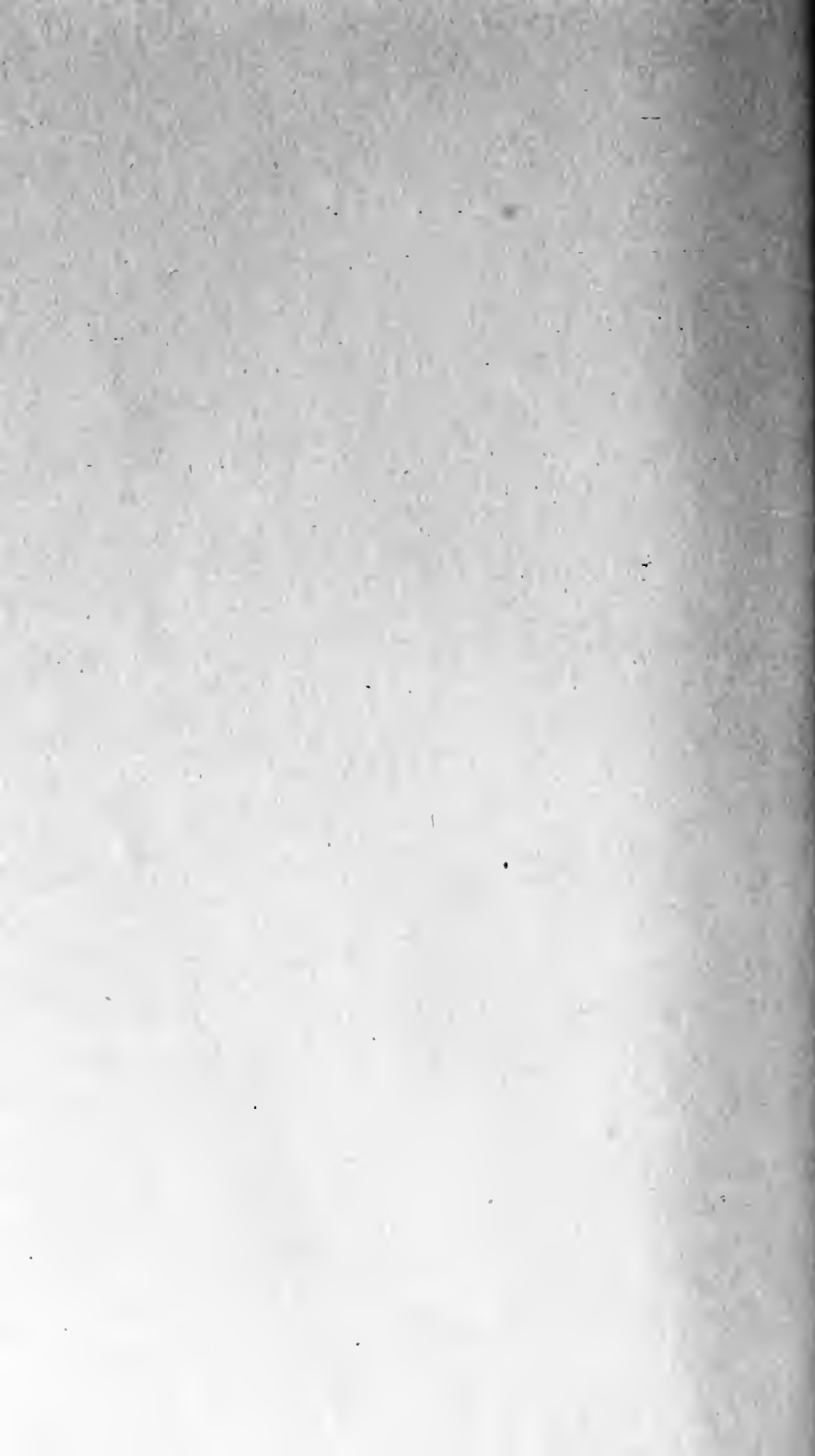
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**MAY - 9 1952**

**PAUL P. O'BRIEN**  
**CLERK**



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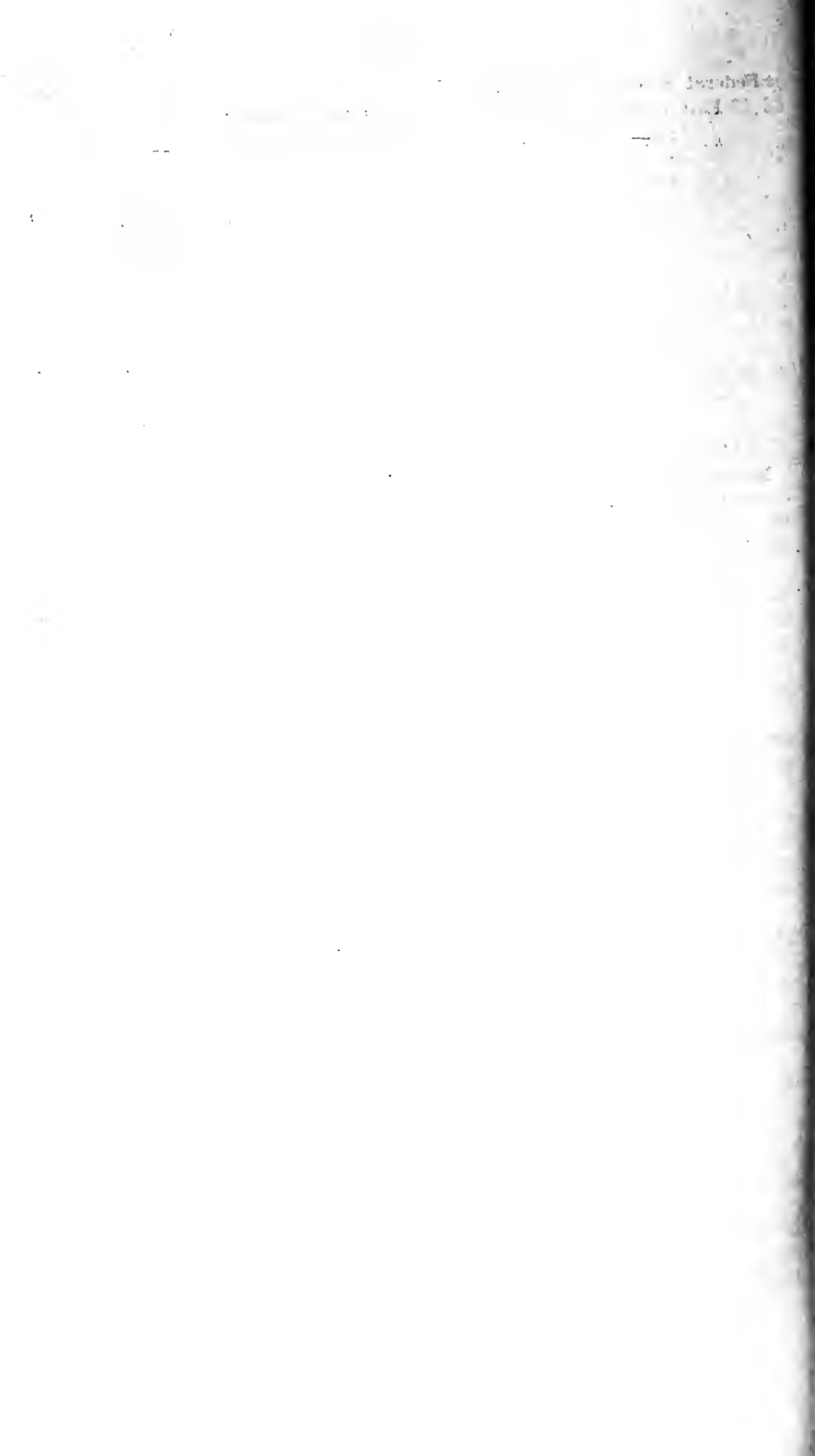
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# **In the United States Court of Appeals for the Ninth Circuit**

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No. 13114

**WAIALUA AGRICULTURAL COMPANY, LIMITED,  
A CORPORATION, APPELLANT**

*v.*

**CIRACO MANEJA, ET AL., APPELLEES**

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*APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE  
DISTRICT OF HAWAII*

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**BRIEF FOR THE SECRETARY OF LABOR, UNITED STATES  
DEPARTMENT OF LABOR, AS AMICUS CURIAE**

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## **STATEMENT OF THE CASE**

The Secretary of Labor, United States Department of Labor, by virtue of Reorganization Plan No. 6 of 1950 (15 F. R. 3174), 64 Stat. 1263, 5 U. S. C. 133z-15, effective May 24, 1950, is charged with duties and responsibilities in the administration of the Fair Labor Standards Act of 1938 (c. 676, 52 Stat. 1060, 29 U. S. C. sec. 201 et seq.). As this appeal presents significant questions concerning the proper interpretation and application of the exemptions contained in Sections 13 (a) (6) and 7 (c) of the Act which are of importance in its general administration and enforcement, the Secretary, with leave of Court, respectfully submits this brief as amicus curiae.

This is the second appeal in this action brought by appellant employer to obtain a declaratory judgment that the wage and hour provisions of the Act do not apply to any of its employees (R. 6-15, 181-183). The Answer (R. 16-19; 24-26) of the defendant employees, who were originally sued as representative of a class, contended that their employment was covered by the Act, broadly asserted that the exemptions were inapplicable, and counterclaimed under Section 16 (b) for unpaid overtime compensation. Also named as defendants were the union which represented the employees and its regional director. Each side appealed from the original judgment of the district court. Pursuant to an order of this court remanding the cause for further proceedings because of the absence of a positive judgment and detailed findings of fact (178 F. 2d 603, 606), the case was retried. The pleadings were then amended so as (1) to eliminate the representative character of the suit, (2) to name the 42 employees sued in their individual capacity as the sole defendants, and (3) to limit the action to the period from November 20, 1946 to and including September 19, 1947. After a trial at which an extensive stipulation (R. 27-128, 179-181) was introduced and 22 of the employees testified (R. 614, 5), the court entered a judgment from which only the plaintiff-employer has appealed.

Plaintiff, the third largest producer of raw sugar in the Territory of Hawaii, is engaged in (1) growing and harvesting sugar cane, and (2) processing such cane into raw sugar at its mill. It provides its own supporting railroad transportation, repair, maintenance, and other services. Plaintiff contends that the agriculture exemption of Section 13 (a) (6) exempts *all* of its employees (with the minor exception of some employees working at the company village, see appellant's br. p. 16) from both the minimum

wage and overtime compensation provisions, and that the exemption in Section 7 (c) for processing sugar cane also exempts all of its employees except those who work on the fields where the sugar cane is grown from the overtime requirements of the Act. It employed 1,144 persons as of September 1946 (R. 36) over an area of 9,663 acres (R. 33). Their work and duties are described in the stipulation in detail (R. 27-128), which is summarized below as it relates to the issues herein discussed.

### **Farming**

The trial court found that in its farming activities, plaintiff employs field workers (R. 633-4; 643) who plow the land (R. 39-40; 191), plant the seed (R. 40-42), cultivate and fertilize the soil (R. 42-44), irrigate the land (R. 45-8, 308-10), and harvest the crop (R. 52-59; 193, 196). They also move the cut cane over portable track (R. 58-59; 198-201) to plaintiff's main line railroad. Since cane is grown in Hawaii on a year around basis, "the cane lands are in various stages of production or preparation" (R. 35). The employees who work in the fields move from one area to another depending upon the program of plowing, planting, irrigating, fertilizing, applying herbicides and insecticides, weeding, and harvesting" (R. 35).

### **Manufacturing**

The court below also found that to carry on its function as a processor of sugar cane, plaintiff operates and maintains a mill composed of a cane cleaning plant, a cane crushing room, a boiling room, and a bagging room (97 F. Supp. at 207,<sup>1</sup> R. 723). The mill

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<sup>1</sup> References are made to portions of the opinion of the district court appearing in 97 F. Supp. 198, 201, which, pursuant to order of court (R. 717, 718), were not printed in the transcript. These consist of the sections on "Statement and Findings" and "Com-

is an industrial type of facility located in the yard area separate and distinct from the growing fields (R. 721, 723; 66-82). In the cane cleaning plant plaintiff's employees operate a series of machines connected by conveyors which receive the cane from the cars, wash off the dirt and mud, and then strip off the leaves (R. 66-72, 310). At the crushing plant the cane passes under a set of revolving knives which chop it up; it then is crushed between a series of large steam-driven rollers (78" wide and 39" in diameter) to extract the juice from the fibre (R. 72-76, 313). The juice is pumped to the boiling house while the remaining cane fibre (called "bagasse") moves by conveyor to the fire room where it is used as fuel in the generation of steam and electricity (R. 75). In the boiling house the juice is clarified, filtered, evaporated to a syrup, crystallized in centrifuges (R. 76-80, 213; 314, 317), and then bagged for storage and shipment (R. 82; 318). In order to install improved equipment and methods of operation as well as to repair mill machinery and equipment, the mill is closed down for approximately three months each year (97 F. Supp. at 208; R. 109-111; 114-116; 176).

#### Transportation and maintenance

Plaintiff operates a railroad, maintains service shops for the repair and overhaul of its field, transportation, and mill equipment, operates a laboratory for testing its products during the course of field and mill operations (R. 103), a plant for the manufacture of concrete products (R. 105), warehouses (R. 84; R. 106-108), stables (R. 109), a village community, "similar to a typical small town of a farming com-

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merce Coverage." The sections on "Findings of Fact" with respect to the individual work weeks of each defendant, and the "Conclusions of Law" appear in the Record at 190-320.

munity center" (97 F. Supp. at 213), which houses all but 16 of plaintiff's employees (R. 121), and an administrative organization (R. 108).

Plaintiff's railroad system consists of 56 miles of main line and nine miles of portable track. It is equipped with ten locomotives and seven hundred twelve cane cars (R. 59-61). Plaintiff maintains a roundhouse for servicing this equipment (R. 103). As the lower court found, the personnel employed to perform this function are typical railroad employees—locomotive engineer (R. 205-206), locomotive repairman (R. 206-208), and section hand (R. 208-210); they do no farm work (R. 204-212). The investment in the railroad amounts to nearly \$800,000 (R. 647).

Plaintiff maintains complete shops for prompt minor repair and emergency work and major overhaul (R. 94) which employ upwards of 100 men (R. 94-103). They are housed in several substantial buildings separate from the processing operations in an area up to 300 feet from the mill (R. 723). They include a machine shop, welding shop, blacksmith shop, tinsmith shop, cane loading machine repair shop, tractor repair shop, garage, electric shop, carpenter shop, paint shop, and plumbing shop (R. 94-103). The persons employed in these activities are persons with highly specialized skills—machinists, welders, electricians, painters, carpenters, etc. (R. 94-103). They do no general farm work (R. 94-103).

The court below held that "in the conduct of these enterprises, plaintiff has assumed a variety of functions including those of farmer, carrier, manufacturer, shipper and operator of village communities." (97 F. Supp. at 218). It concluded that "Railroading is not farming or processing, nor intended by the Act to be a part of either" (97 F. Supp. at 221), that processing

of the cane is a separate function and not a subordinate part of farming (97 F. Supp. at 223), and that the repair shops are "self-sufficient units, operated not as an incident to any other operation exclusively or dominantly, but rather as an integral part of the overall combination of separate enterprises jointly conducted by plaintiff" (97 F. Supp. at 225).

On the basis of these findings and conclusions the court below entered a judgment with which the Secretary concurs except for a minor difference noted *infra*.<sup>2</sup> The court below held:

(1) The Section 13 (a) (6) exemption is applicable to employees engaged in plowing, planting, cultivating, fertilizing, irrigating, and harvesting, including transporting the cut cane over the portable track to the main line railroad, but does not apply to any function or activity beyond "the concentration of cars loaded with cane, upon the main line railroad" (97 F. Supp. at 220). (2) The Section 7 (c) exemption is applicable to "the work of employees which takes place in the mill, in connection with the operation of processing machinery and activities closely and intimately connected therewith" (97 F. Supp. at 223), including the work of employees making repairs during the weekend shutdown (97 F. Supp. at 224), but is not applicable to the work of employees performing any of the farming, transportation, maintenance and repair (other than during the weekend shutdown), or village maintenance activities. (3) An exemption is applicable to any work week in which a defendant engaged exclusively in one or more exempt activities but does not apply "where in any given work week a defendant engaged in [covered] activities some of which were nonexempt" (97 F. Supp. at 233).

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<sup>2</sup> See footnote 7, page 9.

## QUESTIONS PRESENTED

1. Whether employees engaged in operating the main line railroad, in processing cane into raw sugar at the mill, or in providing repair and maintenance services for the mill and railroad are employed in "agriculture" within the meaning of Section 3 (f) of the Act, and are, therefore, exempt from the minimum wage and overtime provisions of the Act by Section 13 (a) (6) thereof.

2. Whether employees engaged in operating and maintaining the mainline railroad, repairing and maintaining mill machinery during the off season, or engaged in generating steam and electric power are exempt from the overtime provisions of the Act by virtue of the Section 7 (c) exemption for processing sugarcane.

3. Whether employees who in the same workweek perform work, part of which is of the type described in Sections 13 (a) (6) or 7 (c), and part of which is covered and not subject to any exemption are exempt from the overtime requirements of the Act.

## ARGUMENT

### I

**The Section 13 (a) (6) exemption for employees employed in agriculture applies to those performing appellant's farming function, but does not extend to those operating appellant's sugar mill, or railroad, or the repair and maintenance services for the mill and railroad**

Appellant operates a farm, a factory, a railroad, a repair and maintenance shop, and other services (R. 33-5; 66-83; 59-64; 94-103). The fact that some of its employees are engaged in farming does not make the Section 13 (a) (6) exemption applicable to its employees engaged in these other operations. The duties of the employee determine the application of

the exemption ("any employee employed in agriculture") just as they determine the application of the coverage provision ("any of his employees who is engaged in commerce or in the production of goods for commerce") *Walling v. Jacksonville Paper Co.*, 317 U. S. 564; *Kirschbaum Co. v. Walling*, 316 U. S. 517.<sup>3</sup>

Agriculture is defined in Section 3 (f) of the Act as including: <sup>4</sup>

\* \* \* farming in all its branches and among other things includes the cultivation and tillage of the soil \* \* \* the production, cultivation, growing, and harvesting of any agricultural or horticultural commodities \* \* \* and any practices \* \* \* performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market.

The court below decided that the Section 13 (a) (6) exemption was applicable to employees engaged in activities beginning with the preparation of the land for planting and ending with hauling the harvested cane to the main line railroad.<sup>5</sup> This exemption was held not applicable to the employees engaged in any

<sup>3</sup> Compare the similarly worded exemptions provided in Sections 13 (a) (1), 13 (a) (3), 13 (a) (5), and 13 (a) (10), and contrast 13 (a) (4), 13 (a) (9), and 13 (b) (2) showing a choice of different language when it was intended to make exemption depend upon the type of employer.

<sup>4</sup> The pertinent statutory provisions are set out in full in the appendix, *supra*, pp. 37-38.

<sup>5</sup> Specifically the court held that the following activities were exempt under 13 (a) (6): Using a tractor to prepare the field for planting by clearing rocks, weeding, plowing; using a tractor to clear irrigation ditches and to make beds for portable track; burning cane in preparation for harvesting; operating cane loading



other function or activity.<sup>6</sup> Appellant contends that Section 13 (a) (6) exempts (with minor exceptions not relevant here) all of its employees (br., p. 11). The Secretary of Labor and the Administrator of the Wage and Hour and Public Contracts Divisions have interpreted Section 13 (a) (6) as it was interpreted by the court below except that they believe it also exempts employees exclusively engaged in repairing and maintaining equipment and facilities used only in the performance of activities exempt under this section.<sup>7</sup>

machines to cut and load cane; operating a tractor to haul cane cars to and from the mainline railroad; picking up scattered cane in fields; bulldozing cane into piles; making minor repairs to field equipment; operating the irrigation system (R. 191, 194, 196, 198, 201, 308-10).

<sup>6</sup> Specifically, the court ruled the 13 (a) (6) exemption was not applicable to the employees engaged in the operation of the *main-line railroad* (locomotive engineer (R. 205-6), locomotive repairmen (R. 206-7), section hand (R. 208-9), crossing watchman (R. 210-1)); or in the operation of the *processing mill* (cane cleaner (R. 310-2), crushing plant operator (R. 213), evaporator operator (R. 212-3), centrifugal machine operator (R. 314-6), boiling house employee (R. 316-8)); or in the *bagging and warehousing of sugar* (bagger and loader (R. 317-8), warehouse clerk (R. 318-9)); or in the *operation of the utility plant* (boiler fireman (R. 216-8), power plant operator (R. 218-220)); or the performance of *maintenance and repair work* (auto mechanic (R. 220-223), welder (R. 223-226), machinist (R. 227-231), tractor mechanic (R. 231-235, 273-276), caneloading machine repairman (R. 239-243), blacksmith (R. 243-248), painter (R. 256-257), concrete products operator (R. 257-8), plumber (R. 259-263), carpenter (R. 264-273, 277-8)); or the following *miscellaneous occupations* (clerk-stenographer (R. 319-320), truck driver (R. 235-239, 248-256), road grader (R. 279-283), laboratory technician (R. 285-286), utility clerk (R. 286-288)).

<sup>7</sup> Thus, it is the position of the Secretary that a workweek spent in repairing tractors, tractor auxiliary implements, or cane loading machines is within the Section 13 (a) (6) exemption provided the equipment was used exclusively for plowing, planting, culti-

The Supreme Court's analysis of the Section 13 (a) (6) exemption in *Farmers Irrigation Co. v. McComb*, 337 U. S. 755 supports the view taken by the Secretary and the court below. There it was held that the employees of a mutual irrigation company which was owned by farmers and distributed water to their individual farms were not exempt under Section 13 (a) (6) since the irrigation system was neither operated by a farmer nor on a farm. In reaching this conclusion the court analyzed the exemption thus:

First, there is the primary meaning. Agriculture includes farming in all its branches. Certain specific practices such as cultivation and tillage of the soil, dairying, etc., are listed as being included in this primary meaning. Second, there is the broader meaning. Agriculture is defined to include things other than farming as so illustrated. It includes any practices, whether or not themselves farming practices, which are performed either by a farmer or on a farm, incidently to or in conjunction with "such" farming operations. [337 U. S. at 762-763.]

It is apparent that only under the second meaning need we give more than passing consideration to plaintiff's processing, transportation, and maintenance employees. Clearly employees who engage in operating the mill or railroad or in repairing either are not engaged in "the cultivation and tillage of the soil" or "the production, cultivation, growing and harvesting"—the branches of farming.

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vating, harvesting or moving the portable track. For example, contrary to the conclusion of the court below, we would regard the exemption as applicable to Hayashi's workweek of January 6 (R. 197) during which all of his work was in the repair of cane loading machine #303 as that machine was used exclusively to cut and load cane in the fields (R. 295).

And it is principally under this second meaning that the plaintiff seeks to have the exemption for employees engaged in agriculture applied to its employees engaged in manufacturing raw sugar, operating its main line railroad, its repair, maintenance, and other activities (br., p. 28). But the employees engaged in these activities do not come within this definition, first, because plaintiff neither performs these operations in its capacity as a farmer nor are they performed on a farm, and second, because they are not performed "as an incident to or in conjunction with such farming operations."

Plaintiff is both a farmer and a processor; its 9,663 acres (R. 33) include a farm and a manufacturing plant (R. 723) as well as numerous transportation, repair and other facilities. "The mill operations are so conducted as to assume the character of a distinct business enterprise of an industrial nature" (97 F. Supp. at 222), in buildings separate and in an area distinct from the growing fields (R. 721, 723, 66-82); they account for 29 percent of the total direct operating charges (R. 178). Appellant neither performs processing as a farmer nor on a farm any more than it engages in farming as a processor or in a factory; it functions in several capacities on its 9,663 acres (R. 33). The actual separation of functions is demonstrated in a number of ways. The areas allotted to growing sugarcane are distinct from those allotted to processing and those occupied by the main line railroad and the repair activities (R. 721, 723). Organizationally, the functions are separated; the farming operations are performed through a field department (R. 633-4; 643) headed by a field superintendent; the processing, transporting, and repair operations are performed through a factory and shop department headed by a factory superintendent (R. 633-4; 643). Operating charges are segregated according to culti-

vating, irrigating, harvesting, general field expense, transportation and manufacturing (R. 178). The mill is operated by a separate work force which does no work in the field (97 F. Supp. at 223).

To accomplish its purpose of producing raw sugar, appellant plainly engages in many separate and distinct enterprises appropriate to that end, including manufacturing and transportation, as well as farming. This integration of business operations neither conceals the essential nonagricultural character of appellant's manufacturing functions nor submerges the fact that appellant, in operating a hybrid type of business, has assumed the functions of a manufacturer and a railroad company, as well as those of a farmer.

In this, appellant occupies a position with reference to the agriculture exemption analogous to the relationship of a chain store corporation to the "retail \* \* \* establishment" exemption provided in Section 13 (a) (2). As there is no exemption for wholesale establishments, and as the central offices and warehouses of such chains serve the economic function of the wholesaler, the Supreme Court has held that "most chain store organizations are \* \* \* of a hybrid retail-wholesale nature," and has denied the "retail \* \* \* establishment" exemption to such central offices and warehouses. *Phillips Co. v. Walling*, 324 U. S. 490, 495. Just as the chain store cannot obtain the retail exemption for its central office and warehouse merely because the services of those units are restricted to exempt retail outlets, so here, appellant cannot achieve exemption for its separate manufacturing function and its railroad activities simply because it utilizes them only for the products of its farm.

Furthermore, even if appellant were performing the manufacturing, railroad, and repair operations as

a farmer, and even if they were performed on a farm, the exemption, by its terms, has no application unless the operations are conducted as an "incident to or in conjunction with such farming operation." In the context of the statute as a whole, it seems plain that this requirement is not satisfied merely by the fact that the railroading and processing must necessarily occur subsequent to the growing and harvesting of sugar cane. Sections 13 (a) (10) and 7 (c) show a design to treat separately the many types of operations which are "incident to or in conjunction with" farming only in the sense that they are performed on agricultural commodities subsequent to harvesting.

Appellant, in discussing this requirement, places the emphasis on the word "such" (br., p. 31), and argues that since it processes only cane grown on its own farms, the operation of the railroad and the manufacturing of raw sugar is "incident to or in conjunction with *such* farming" (emphasis supplied). This, however, assumes that the operation of a railroad is "incident to or in conjunction with" the function of farming. But, as *Calaf v. Gonzalez*, 127 F. 2d 934, 938 (C. A. 1) held, "what we have in the case before us is a mill engaged in the processing of sugar cane and also engaged in the transportation of that sugar cane from farms to the mill. There seems no rational basis for saying that simply because the ownership of the mill and the farms is in the same hands that, therefore, those employees who are engaged in an activity which is separate and distinct from agriculture are exempt from the provisions of the Act." The *Calaf* case is squarely in point here. It involved precisely the same kind of hybrid operation in Puerto Rico. Contrary to the statements on pages 31, 40 and 42 of Appellant's brief, nothing in *Farmers Ir-*

*rigation Co. v. McComb*, 337 U. S. 755 supports the view that the railroad and manufacturing activities here involved are "incident to or in conjunction with" the farming activities merely because they are restricted to, or use as raw materials, crops grown by the same corporation. Plainly irrigation bears a closer relation to farming than converting crops into manufactured products. Indeed, the very decision cited with approval in the footnote on which appellant relies, *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1), held that mill and railroad employees would not fall within the reason for the exemption since they were typical factory workers or laborers engaged in maintaining industrial facilities.

Appellant's main line transportation and manufacturing activities cannot properly be regarded as being performed "in conjunction with" or "incident to" its farming operations. They obviously occur separately from and subsequent to the farming operations. Their substantial, as distinguished from incidental, importance in relation to the farming operations is demonstrated by appellant's record of its total direct operating charges (R. 178). The direct operating charges attributable to main line transportation and manufacturing alone are 55 percent of all other such charges, including those for the agricultural activities. Both the main line transportation and manufacturing activities require organization, equipment, and skills quite unrelated to farming. As the court below observed:

A separate work force is employed for the processing operation in the mill; it does no work in the fields; it is paid in accordance with a scale of hourly rates which are different and distinct from the system used, partly at contract rates and partly at hourly rates, to pay farm labor [97 F. Supp. at 223].

Railroad operation is a systematic business calling for the employment of skilled, experienced men, trained to quick, keen perception (not farm hands or mill hands) for handling locomotives and moving cars (not the goods in transit), and for the maintenance of roadbed, track, and structures, and roundhouse care and servicing of locomotives—all specialized technical work [97 F. Supp. at 221].

Since neither the processing function nor the transportation activities are performed in “conjunction with” or “incident to” the farming function, it follows *a fortiori* that the repair and maintenance of equipment used in these operations cannot come within the 13 (a) (6) exemption.

Appellant asserts that its substantial activities in operating the mill, running the railroad, and providing the repair and maintenance services do not distinguish it from farmers generally in that “every farmer” is a “carrier” and a “manufacturer” in addition to being a farmer because he “hauls his products from the fields to storage” or to market after transforming the product he grows “into marketable condition” (br., p. 24). But what appellant fails to recognize is that while farmers generally have barns, silos, and wells (br., p. 30), appellant here has elaborate industrial and railroad facilities (R. 721–723) not to be found on a typical farmer’s acreage, and while some farmers may engage in processing or transportation activities through employees who normally work at tilling the soil, here the appellant performs these functions through a separate organizations (R. 633, 4; 643) and employs a large number of specially skilled craftsmen who do no farming (97 F. Supp. at 221, 225).

To apply the “agriculture” exemption to appellant’s manufacturing and main line railroad activities would

be to apply in Hawaii a rule at variance with the settled judicial interpretation of the Act which has been applied for years to this country's equally important sugar producing area of Puerto Rico. In its previous decision (178 F. 2d at 611) this Court appears to have regarded the decisions in *Calaf v. Gonzalez*, 127 F. 2d 934 (C. A. 1), and *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1) as based on the concept that the employer was "a communal enterprise by several farms." Clearly, however, this is not the basis on which the Court of Appeals for the First Circuit rested its decision in either of the above cases or in the later case of *Vives v. Serralles*, 145 F. 2d 552 (C. A. 1). In the first case presenting the question of the application of the Section 13 (a) (6) exemption to an organization which both grew sugarcane and processed it into raw sugar and molasses, the First Circuit held that the exemption did not apply to the processing operation. *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1). The only significant difference between the facts of that case and the one at bar is that there between 30 and 40 percent of the cane processed was grown by independent growers. That difference, however, is pertinent to only one of the three independent bases on which the court held that the processing did not come within the section of the definition on which appellant here relies. The court pointed out that the legislative history demonstrates that the purpose of that provision was "to make certain that independent contractors such as threshers of wheat, who travel around from farm to farm to assist farmers in what is recognized as a purely agricultural task, should be included within the definition of agricultural employees, and also to assist a farmer in getting his agricultural goods to market in their raw or natural state. See 81 Cong. Rec. 7876, 7888." The court further held:



Furthermore, it would seem that the employees involved in this case would not fall within the reason for the exemption which was accorded to agricultural employees. The Act was drawn not to include the latter because agricultural labor was not subject to the usual evils of sweatshop conditions of long hours indoors at low wages. Also any attempt to regulate agricultural wages would present a difficult problem since a substantial part of the agricultural workers' income must of necessity be for board and room. The employees in the instant case are typical factory workers or laborers engaged in maintaining industrial facilities. The exemption of agricultural labor from the operation of the Act is not admissible as an argument to exempt labor in an industry from its operation. *Fleming v. Hawkeye Pearl Button Co.* [113 F. 2d 52 (C. A. 8)]; cf. *North Whittier Heights Citrus Assn. v. National Labor Relations Board*, 109 F. (2d) 76, 80-81 C. C. A. 9th, 1940). For these reasons we reject the appellants' contention that the employees here involved are engaged in agriculture within the meaning of Section 13 (a) (6) and Section 3 (f) [117 F. (2d) at 18].

While the First Circuit also indicated that the fact that some of the cane processed was grown by independent "colonos" was a ground for holding the processing operation not merely "incidental," the two additional independent grounds of decision quoted above with reference to the legislative history of and reason for the exemption are equally applicable to the case at bar and require the same conclusion.

The significance of these two additional grounds became evident in the case of *Calaf v. Gonzalez*, 127 F. (2d) 934 (C. A. 1) which dealt with the application of the "agriculture" exemption to employees working on railroad transportation facilities used to

transport cane to a sugar mill. The mill, the railroad, and some of the farms on which the cane was grown were all owned jointly by the defendants. Though the railroad was also used to transport cane grown on farms owned severally by the defendants and on one farm owned by an independent "colono," the court expressly refused to base its decision on this fact. It stated, "We place our decision, however, on the broader ground that the transportation of sugarcane is incident to milling rather than to farming and therefore is not exempt under the Act" (127 F. (2d) at 936-937) and proceeded to give reasons for its conclusion just as though this fact on which appellant relies to distinguish the case did not exist. Thus, it stated that "The mere fact that in this case the owners of the farms are also the owners of the mill and the transportation facilities does not make transportation an incident to farming," (*id.* at 937) and "There seems no rational basis for saying that simply because the ownership of the mill and the farms is in the same hands that, therefore, those employees who are engaged in an activity which is separate and distinct from agriculture are exempt from the provisions of the Act" (*id.* at p. 938). It follows, of course *a fortiori* that since the exemption is inapplicable to transportation workers because transportation is incident to milling rather than farming, it is also inapplicable to mill employees under the same circumstances.

The reasoning of the *Bowie* and *Calaf* cases supporting our view that the agriculture exemption does not extend to the operation of a main line railroad and the manufacture of raw sugar has been followed in a case like the one at bar, where one business organization operates all the farm lands, the transportation facilities, and the mill (*Vives v. Serralles*, 145 F.

2d 552 (C. A. 1)). Contrary to appellant's assertion (br., p. 41) this case does not support its contention, but leads to the opposite result. It reaffirmed the principle enunciated in the *Calaf* case, *supra*, that "transportation \* \* \* is incident to milling rather than to farming," (*ibid.* at 554) but held the principle inapplicable where the activities under consideration "begin at a point when the sugar cane has been cut in the field and continue up to the concentration point" (*ibid.* at 555). It is at this concentration point that the issue in the instant case arises. The Secretary believes, as the court below held, that the Section 13 (a) (6) exemption was applicable to appellants' employees' engaged in harvesting the cane and bringing it to the main line railroad, but that here, as stated in *Vives v. Serralles*, *supra* at 554, employees "engaged in the operation, repair, and maintenance of the company railroad" are not within the agricultural exemption.

In *Vives v. Serralles*, *supra*, the "concentration point" is fixed with reference to the three types of transportation that were used on the growing fields. One of these types was practically identical with the transportation system used in the case at bar. It is described by the court as follows:

The cane is hauled to the concentration point in various ways; in small railroad cars pulled by oxen over portable tracks to a siding or switch where the cars are picked up by locomotives operated on the permanent tracks; \* \* \* [145 F. 2d. at 553]

Except for the irrelevant detail that appellant used tractors rather than oxen in that part of the transportation which occurred in the growing fields over portable tracks, appellant's system of rail transportation is identical (R. 57).

The reasons which led the Court of Appeals for the First Circuit to fix the point at which the portable tracks meet the permanent tracks as the dividing line between activities which are exempt under Section 13 (a) (6) and activities which are not, are equally applicable to the case at bar. In the *Serralles* case it was pointed out that the wages of laborers in the field engaged in operations up to the "concentration point" were regulated by the Secretary of Agriculture, under The Sugar Act of 1937 (50 Stat. 903; 7 U. S. C. 1100 et seq.). The need for a clear dividing line between the coverage of the two Acts, therefore, suggested the concentration point as an appropriate point of cleavage. The fact that this point also marked the end of the "harvesting" operation according to the interpretation of the Administrator and the view of the court was regarded as decisive. These facts and considerations are equally applicable to the case at bar.

## II

**The Section 7 (c) exemption for processing sugarcane does not extend to employees engaged in repairing and maintaining the sugar mill machinery during the off season, or in operating and maintaining the mainline railroad, or in generating steam and electric power**

Section 7 (c) provides that "In the case of an employee engaged \* \* \* in the *processing* of \* \* \* sugarcane \* \* \* into sugar (but not refined sugar) \* \* \* [the overtime provisions of the Act] shall not apply to his employees in any *place of employment where he is so engaged*" [Emphasis supplied.] This exemption was held by the court below to be applicable to "the work of employees which takes place in the mill, in connection with the operation of processing machinery and activities closely and intimately connected therewith" (97 F. Supp. 198,

223); and to the work of employees engaged in repair and maintenance activities in the mill during the weekend shut down but not during the three months "off season" (R. 176) when the mill is not in operation.<sup>8</sup>

Appellant asserts that the processing exemption is applicable, in addition, to the employees who operate the mainline railroad in transporting sugarcane from the fields to the mill, to employees who repair and maintain the railroad facilities, to employees who repair and maintain mill equipment during the "off season," and to employees who perform such other operations as generating electricity for covered non-exempt uses (br., p. 45).

The Secretary believes the court below correctly construed the exemption in accordance with the terms of the statute and the previous judicial decisions. On its face section 7 (c) is applicable, *first*, only in the case of an employer engaged in a described operation (in the instant case, processing of sugarcane), and, *second*, only as to those of his employees who work in a "*place of employment where he is so engaged.*" [Emphasis supplied.] Obviously, the exemption is not coextensive with *all* of the activities that may be undertaken by an employer who *inter alia* engages in the processing of sugarcane. To be within the ex-

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<sup>8</sup> The exemption was held applicable to employees performing the following work: weighing incoming cane cars at the mill; operating machinery for moving loaded cars into and empty cars out of the mill (R. 310-1); coupling and uncoupling cars at the mill and collecting car tickets (R. 312); regulating the flow of cane through the crushing mills (R. 313); operating machinery for boiling and crystallizing sugar (R. 213, 314-317); operating machinery for bagging sugar and loading bagged sugar into box cars or nearby warehouses (R. 318); and "cleaning and making minor repairs to boiling house equipment" (R. 213).

emption the employees must be engaged in the operations described in Section 7 (c) (i. e., processing of sugarcane), or in operations that are a necessary incident to the described operations and, in addition, they must be working *in* the "place" where their employer is engaged in such processing. On the other hand, the terms of Section 7 (c) do not include employees who work in a "place of employment" where their employer is *not* engaged in the actual processing of sugarcane, although the activities at that place may be, in a broad sense, incidental or necessary to such processing.

Appellant argues (br., p. 48) that the "place of employment where he is so engaged" can include appellants' "entire premises." The entire premises includes appellants' 9,663 acres (R. 33) on which appellant functions both as a farmer and a processor as well as performs various supporting activities (R. 721, 723). The same reasons heretofore advanced to demonstrate that this entire acreage is not a "farm" (*supra*, p. 11) make it equally clear that the entire premises cannot reasonably be deemed the "place" where appellant is engaged in the processing of sugarcane. Appellant's contention reads out of the exemptive provision the phrase "where he is so engaged" which seems clearly intended to limit the exemption to employees working "in" the particular "place" *in* which the employer is actually engaged in the processing operations. Thus, employees in the mill engaged exclusively in processing sugar cane into raw sugar, of course, come within the scope of the exemption. In a case where several contiguous buildings or areas located on the same premises and operated as a unitary establishment devoted to the described operations constitute a single "place of employment," the entire several buildings or areas

are a "place of employment where he is so engaged."<sup>9</sup> On the other hand, where only certain departments, areas, or buildings within an employer's premises are devoted to the described operations, the remaining departments, areas, or buildings cannot be deemed to be part of such "place of employment" without doing violence to the statutory language and the firmly established rules of statutory construction.

These views are fully supported by the decision in *Fleming v. Swift*, 41 F. Supp. 825 (N. D. Ill.), affirmed 131 F. 2d 249 (C. A. 7), which is the judicial authority most directly in point on this issue. The Swift Company was engaged in acquiring and slaughtering livestock and in the processing, manufacturing, and distributing of meat, meat products, and byproducts from livestock. Concluding that the description of operations and processes in Section 7 (c) places "a functional limitation on the classes of employees for whom an exemption from the overtime provisions may be claimed," the court held that the exemption applied on a department basis and not to defendant's whole plant. (41 F. Supp. 831.) Thus the court carved out for exemption only those departments of the meat-packing plant in which "handling," "slaughtering," and "dressing" operations were performed and held that the portions of the plant devoted to those operations constituted the "place of employ-

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<sup>9</sup> It would seem clear, as a correlative concept, that even though contiguous and located on the same premises, several buildings or areas are not always or necessarily component parts of a single place of employment. For example, a contrary conclusion would appear proper where any such building or area is organized and operated as a self-sufficient unit and the operations performed therein are performed independently of operations in the surrounding buildings or areas. Thus, in doubtful cases, factors other than geographical contiguity, such as interchange of personnel, flow of raw materials, payroll records, and techniques of supervision of the employees may have to be considered.

ment," and that employees in other departments, such as those devoted to meat-curing or sausage-making, were not within the scope of the exemption. To the same effect, see *Colbeck v. Dairyland Creamery Co.*, 70 S. Dak. 283, 17 N. W. (2d) 262 (S. Ct. S. D.); *Walling v. De Soto Creamery & Produce Co.*, 51 F. Supp. 938 (D. Minn.).

Appellant has oversimplified the problem presented, therefore, when it argues (br., p. 50-51) that if the railroad employees are engaged in operations incident to processing rather than to farming, then they are necessarily exempt under Section 7 (c).<sup>10</sup> Even assuming that they all are so engaged, the question still remains whether they work at a "place of employment" where their employer is engaged in the processing operations. Clearly most of the railroad

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<sup>10</sup> Appellants incorrectly assert that the decisions of the First Circuit (citing *Bowie v. Gonzalez*, 117 F. 2d 11 and *Calaf v. Gonzalez*, 127 F. 2d 934) assumed that transportation was exempt under Section 7 (c). Nothing in the Court's opinions warrants this conclusion. The *Bowie* case was a suit by the employer for a declaratory judgment that the complete exemptions in Sections 13 (a) (6) and 13 (a) (10) applied. Nothing in the opinions of the district (*Bowie v. Claiborne*, D. P. R. 1939, 1 W. H. Cases 243 1 Labor Cases (C. C. H.) ¶18, 443, not officially reported) or appellate court or the disposition of the case involved any such assumption. Only the appellate opinion is published in the *Calaf* case. It certainly contains no express assumption of the type appellant asserts, and there is nothing to indicate that any overtime hours were worked or overtime compensation sued for so as to involve any implied assumption as to Section 7 (c) in the award of minimum wages. Neither was the problem discussed or decided even by assumption in *Fives v. Serralles*, 145 F. 2d 552 (C. A. 1). In that case the suits of all of the employees but one were dismissed under Section 13 (a) (6), and the remaining employee, though held to be exempt from overtime compensation under Section 7 (c), was employed in the sugar mill and not on the railroad, so here too, no assumption as to the application of Section 7 (c) to transportation is involved even by implication.



employees do not. The train crews (R. 62), section men (R. 62), and crossing watchmen (R. 63) work all along the mainline which comprises some 56 miles of track (R. 60) and borders the entire ocean perimeter of the appellants' land (R. 721). The hostler and engine wiper perform their work in the plantation roundhouse (R. 63), well removed from the mill (R. 723).

The same considerations are applicable to repair and maintenance shops. They are located in separate buildings not connected with the mill where processing takes place (R. 723). Besides, the services performed therein are not principally for the processing activity, and therefore may not be considered incidental to it. While the percentage varies from shop to shop, the other activities of the appellant account for a majority of the work in each shop. It would appear that a very small, if not negligible, proportion of the work of the cane loading machine repair shop (R. 97-8), the tractor repair shop (R. 98-9), and the tinsmith shop (R. 97) was done for the mill. Only in the electric shop (R. 101) does the proportion equal 50 percent, and even here there is no indication that the work for the mill was segregated in any way (R. 213-216).

One of the employees whose status under Section 7 (c) is in issue operated the electric generator in the power house (R. 218-220) which supplied electric power for "operations throughout the plantation" (R. 218), which included, of course, the covered and nonexempt railroad, roundhouse, and office (R. 91, 723). Another operated the machinery in the fire room which produced the steam both to power the electric generator and for use in the mill (R. 216-218). Even if these employees are regarded as being employed in the place where their employer is engaged

in processing sugarcane into raw sugar because that is done in other rooms in the same building (R. 723), the district court was correct in holding the Section 7 (c) exemption inapplicable to them. This is because their duties included the production of electric power for covered activities of their employer not excluded by this or any other exemption from the overtime compensation provisions of the Act. Where exemptions have been provided for "any employee" of designated type of employers, the courts have held that if the employer engages in activities in addition to those which bring him within the exemption, employees who have duties relating to the nonexempt as well as the exempt phase of the business are not exempt despite the literal wording of the exemptive provision. Otherwise an employer within an exemption could engage in many assorted businesses and claim exemptions for all his employees because one of the businesses was described in Section 7 (c) or 13.

Specifically with respect to the exemption in Section 7 (c), the courts have held that employees such as those engaged here in the production of steam and electric power are not within the exemption. In *Walling v. Bridgeman-Russell Co.*, 2 W. H. Cases 785, 6 Labor Cases (C. C. H.) 161,422 (D. Minn., 1942, not officially reported) the court was concerned with the application of the exemption in Section 7 (c) for "an employer engaged in the first processing of milk, whey, skimmed milk, or cream into dairy products \* \* \*." The court held that the "Section 7 (c) [exemption] does not exempt industries from the overtime provisions of the Act, but only the specific processes therein mentioned," and accordingly ruled that the exemption did not apply to employees in the same place of employment who made the steam and generated the power used exclusively for op-

erating equipment and heating and lighting the building where activities described in the exemption and other related activities not so described were carried on. *Shain v. Armour*, 50 F. Supp. 907 (W. D. Kentucky, 1943) also arose under the same portion of Section 7 (c) and also involved the application of the exemption to "employees engaged in producing steam, heat and power" for exclusive use in the same building in activities described in the exemption and related activities not so described. The court held the exemption was inapplicable because "Section 7 (c) of the Act does not exempt industries as a whole from the overtime provisions of the Act, but only those specific processes therein mentioned" [50 F. Supp. at 911].

The same principle has been applied to the other so-called "employer" exemptions provided in the Act. *Walling v. Connecticut Co.*, 154 F. 2d 552 (C. A. 2) also involved employees engaged in the production of electric power for use by their employer in his exempt business as electric railway carrier. Though Section 13 (a) (9) exempts "any employee" of such an employer, it was held not to apply to these employees because the power they produced was used in operating nonexempt instrumentalities of interstate commerce as well as the exempt electric railway. So here, the use of part of the power produced by appellant's employees in the covered and nonexempt railroad and office activities makes the exemption restricted to processing sugarcane inapplicable to these employees. Another instance in which the court refused to apply the literal terms of an exemption because to do so would produce a result not fairly within its purpose is presented by the decision of the Eighth Circuit in *Northwest Airlines v. Jackson*, 185 F. 2d 74, certiorari denied, 342 U. S. 812. There the exemption in Section 13 (b) (3) for "any employee of a car-

rier by air" was held not to apply to employees of such a carrier whose duties related to modification of planes for the Government. Similarly in *Davis v. Goodman Lumber Co.*, 133 F. 2d 52 (C. A. 4) the exemption in Section 13 (a) (2) for "any employee employed in any retail or service establishment \* \* \*" was held inapplicable to employees working in the manufacturing phase of the employer's retail establishment. To the same effect see *Wabash Radio Corp. v. Walling*, 162 F. 2d 391 (C. A. 6); *Western Union Telegraph Co. v. McComb*, 165 F. 2d 65 (C. A. 6), certiorari denied, 333 U. S. 862; *Nelson v. Agwilines*, 70 F. Supp. 497 (S. D. N. Y.).

The district court also held that the Section 7 (c) exemption is inapplicable to employees engaged in mill repair and maintenance work during the "off season," a period of approximately three months each year when processing operations have been definitely suspended and major maintenance and repair activities are undertaken. The "off season" ruling, we submit, is consistent with the legislative purpose of Section 7 (c), and in accord with judicial authority.

While employment in the "place" where the processing is carried on is a necessary condition to the applicability of the exemption, the words "place of employment," as appellant contends (br., p. 56), are not the controlling words in determining the applicability of the exemption during the off season. The language of the section is clear that the exempt employees must be employed in a "place" where the employer is engaged in one of the processing operations. But it is not enough that the "place" is devoted to activities related in some way, or necessary, to processing which may ultimately take place; it is also essential that at the time these activities occur, the employer is engaged in processing. During the "off season," however, when processing operations

are completely and definitely suspended for a period of three months, it is stretching the statutory language considerably to conclude that the processing operations are being engaged in by appellant. See *Maisonet v. Central Coloso, Inc.*, 2 W. H. Cases 753, 6 Labor Cases (C. C. H.) ¶61,337 (D. P. R.) not officially reported. In the *Maisonet* case the issue was squarely presented whether the employees were entitled to receive overtime pay during the dead season. The court, in holding that the exemption was inapplicable, since their employer was not engaged in processing at that time, noted that the economic conditions with which the exemption is supposed to be concerned do not obtain during the dead season, and that the mill could easily spread employment sufficiently during that season so as to avoid the necessity of overtime work. To the same effect, see *Heaburg v. Independent Oil Mill*, 46 F. Supp. 751, 754 (W. D. Tenn.), in which the court pointed out that "the 'dormant' season activities \* \* \* such as maintenance, repair, clerical and sales work, while incidental to and connected with the defendant's business of the 'processing of cottonseed' is not 'processing' within the intent of the Act and is not sufficient to bring the employer within the exemption 7 (c) during such period." See also *Abram v. San Joaquin Cotton Oil Co.*, 49 F. Supp. 393 (S. D. Calif.).

As in the cases cited above, appellant's three-month "off season" is a period devoted to repair and maintenance work on a vast scale, designed to safeguard its capital investment and for the installation of improvements (97 F. Supp. at 208) as well as to insure the uninterrupted functioning of the mill during the harvest season. The assertion by appellant (br., p. 55) that the Section 7 (c) exemption is a year around exemption is not inconsistent with the

position that "off season" work is nonexempt, for it is clearly implicit in the language of the exemptions that they are based on the premise that processing operations are being conducted during the entire year. If they are, then the exemption is an "absolute" year around exemption. But where, as here, they are not, then the exemption is applicable, in the language of the provision, only during such seasons as the employer is engaged in processing operations.

### III

**When an employee in the same workweek performs both work exempt under either Section 13 (a) (6) or Section 7 (c) and covered nonexempt work, he should receive the minimum wage and overtime benefits of the Act**

The Secretary believes that the decision below is correct in holding that an employee is entitled to the minimum wage and overtime benefits of the Act for work performed in any workweek in which he performs both exempt and covered nonexempt work. Appellant's contention that "Congress intended the exemption to apply to an employee in any workweek in which he does not devote a *substantial part* of his time to an activity not exempt" (br., p. 77), is directly contrary to the firmly established rule of statutory construction that exemptions from remedial legislation are to be strictly construed. *Phillips Co. v. Walling*, 324 U. S. 490; *Consolidated Timber Co. v. Womack*, 132 F. 2d 101 (C. A. 9); *Fleming v. Hawkeye Pearl Button Co.*, 113 F. 2d 52 (C. A. 8).

Equally lacking in merit is appellant's other contention that a denial of a tolerance for nonexempt work defeats the purpose of the exemption. Sections 13 (a) (6) and 7 (c) exempt not only those directly engaged in the operations specifically mentioned, but also others whose work is "incident to

or in conjunction with" such operations (Section 13 (a) (6)) or who perform incidental work in the same place of employment (Section 7 (c)). Thus, both the type of work for which the exemption is designed and the tolerance for related work are stated with particularity. There is, therefore, no occasion to broaden these exemptions by a further tolerance allowance. Furthermore, to do so would contravene the principle well established under this Act that "Such specificity in stating exemptions strengthens the implication that employees not thus exempted \* \* \* remain within the Act." *Powell v. United States Cartridge Co.*, 339 U. S. 497, at 516. See also *Addison v. Holly Hill Co.*, 322 U. S. 607, at 617: "Exemptions made in such detail preclude their enlargement by implication."

In refusing to "extend an exemption to other than those plainly and unmistakably within its terms and spirit" (*Phillips Co. v. Walling*, 324 U. S. 490, 493), the courts have uniformly refused to interpret exemptions in such a manner as to exempt activities which Congress obviously did not intend to exclude from the scope of the Act. The problem has usually arisen, as in the instant case, where both exempt and non-exempt activities are involved. Where exemptions depend on the particular duties performed by employees, the performance of both exempt and non-exempt activities by an employee in the same workweek results in the loss of the exemption. *McComb v. Puerto Rico Tobacco Marketing Coop Assn.*, 80 F. Supp. 953, aff'd 181 F. 2d 697 (C. A. 1); *North Shore Corp. v. Barnett*, 143 F. 2d 172 (C. A. 5); *Anderson v. Manhattan Lighterage Corp.*, 148 F. 2d 971 (C. A. 2) certiorari denied, 326 U. S. 722; *McComb v. Del Valle*, 80 F. Supp. 945 at 951 (D. P. R., 1948); *Shain v. Armour & Co.*, 50 F. Supp. 907 (W. D.

Ky.); *Walling v. DeSoto Creamery & Produce Co.*, 51 F. Supp. 938 at 943 (D. Minn.); *Fleming v. Swift & Co.*, 41 F. Supp. 825 (N. D. Ill.) affirmed, 131 F. 2d 249 (C. A. 7); *Walling v. Peacock Corp.*, 58 F. Supp. 880, 883 (E. D. Wis.); *Sykes v. Lockmann*, 156 Kan. 223, 132 P. 2d 620 certiorari denied, 319 U. S. 753; *Jordan v. Stark Bros. Nurseries*, 45 F. Supp. 769; *Walling v. Bridgeman-Russell*, 2 W. H. Cases 785 (D. Minn.) 6 Labor Cases (C. C. H.), ¶161,422 (not officially reported); *Loeb v. Ideal Packing Co.*, 7 Wage Hour Rept. 397, 8 Labor Cases (C. C. H.) ¶162,150 (Wis. C. C., Mil. Co., 1944); *Gaskin v. Clell Coleman & Sons*, 5 Wage Hour Rept. 581 (Ky. C. C. Mercer Co., 1942).

The operation of the above rule in a case involving the Section 7 (c) exemption is well illustrated by the decision in *Shain v. Armour & Co.*, *supra*. Although the major part of the plant's activities were devoted to the processing of butter and the employer therefore contended that all of his employees were exempt, only those employees "as devote their time *exclusively* to the first processing of cream into butter" were held to be within the exemption (6 Wage Hour Rept. 715). [Italics supplied.] And, the court specifically denied the exemption to employees who "devote part of their time during the workweek to duties other than the first processing of cream into butter" (*ibid*). Similarly, in *Walling v. Bridgeman-Russell*, *supra*, the Section 7 (c) exemption was only deemed applicable to employees "who perform exclusively the operations described in this Section" (2 W. H. Cases at 790), and once again, the exemption was specifically denied if "during any part of the workweek, the employee performs duties which do not fall within the scope of the exemption" (*ibid*). To the same effect in additional cases involving the Section 7 (c)



and Section 13 (a) (6) exemptions, see *McComb v. Puerto Rico Tobacco Marketing Coop. Assn.*, *supra*; *McComb v. Del Valle*, *supra*; *Fleming v. Swift & Co.*, *supra*; *Jordan v. Stark Bros. Nurseries*, *supra*; *Walling v. DeSoto Creamery & Produce Co.*, *supra*; *Walling v. Peacock Corp.*, *supra*; *Sykes v. Lockmann*, *supra*; and *Loeb v. Ideal Packing Co.*, *supra*. For similar rulings with respect to other exemptions, see *North Shore Corp. v. Barnett*, 143 F. 2d 172 (C. A. 5) (employee engaged as telephone switchboard operator within meaning of Section 13 (a) (11), who also performed other duties of a nonexempt nature); *Anderson v. Manhattan Lighterage Corp.*, 148 F. 2d 971 (C. A. 2) certiorari denied, 326 U. S. 722. See also *Wabash Radio Corp. v. Walling*, 162 F. 2d 391, 394 (C. A. 6).

Thus, the courts have recognized that if more than lip service is to be paid to the principle that "any exemption from [this] humanitarian and remedial legislation must \* \* \* be narrowly construed" and not extended "to other than those plainly and unmistakably within its terms and spirit" (*Phillips Co. v. Walling*, 324 U. S. 490, 493), exemptions cannot be held applicable to an employee or an employer simply because he engages in some exempt work if he also engages in other work which Congress clearly intended to subject to the statutory standards. Any other interpretation would open the door wide to evasion of the purpose of the Act to eliminate substandard labor conditions. It would result in absorbing into the exemptions parts of industries and activities plainly covered by the Act, simply because the same employees or employers happened to engage in several kinds of activities.

The position taken by the courts in the foregoing cases and by successive administrations over a period

of years (see Interpretative Bulletin No. 14, par. 37, p. 22) accords with the evident intent of Congress in defining with extraordinary particularity the scope of the exemptions here in question. Congress did not merely exempt by Section 13 (a) (6) employees "employed in agriculture." It went further, and, in Section (3) (f) gave a very detailed definition of agriculture which included not only traditionally agricultural activities but also "any practices \* \* \* performed by a farmer or on a farm as an incident to or in conjunction with such farming operations." This language in itself provides a substantial tolerance for activities which are not of a strictly agricultural nature. In addition, Congress provided other exemptions for related processing activities in Sections 7 (c) and 13 (a) (10) of the Act. The legislative history indicates that these exemptions were considered together and were intended to be a comprehensive and exclusive list of the activities in this field which Congress desired to exempt. As the courts have also emphasized, all the sections relating to these exemptions "are in *pari materia* and must be construed together to form a consistent whole, if possible." *Bowie v. Gonzalez*, 117 F. 2d 11. Applying these established principles, it seems clear that the detailed language of the statute is so explicit with regard to the scope of the exemption for employees employed in agriculture that no additional tolerance for nonagricultural work can be justified if the intention of Congress is to be given effect.

The situations cited by appellant where the Administrator has allowed a tolerance for nonexempt work are distinguishable from those presented by the exemptions provided in Sections 7 (c) and 13 (a) (6) which are involved in this case. The cases cited in footnote 1 in Appendix E to appellant's brief deal

with the Section 13 (a) (1) exemption which expressly grants the Administrator the power to define by regulation the exempt classifications which are merely identified in the Act only in the most general terms. As the tolerances are expressly provided in the regulation, no question of judicial interpretation is presented, and the cases cited by appellant in connection therewith are not in point.

The other exemptions cited by appellant where the Administrator has allowed and the courts have approved a tolerance for nonexempt work, are cases where the exempt occupation is designated only by an undefined word, or phrase rather than by a precise definition such as is provided in Section 3 (f) and in Section 7 (c). As it is felt that those exemptions were intended to apply to the typical situations or employees designated, the related activities typically found in those situations and occupations should not be regarded as defeating those exemptions. Thus Section 13 (a) (2), cited by appellant in footnote 48 on page 77 exempts employees employed in a "retail \* \* \* establishment." Such establishments generally make a few nonretail sales. Consequently a tolerance has been held appropriate. This explains the decision in *Northwestern Hanna Fuel Co. v. McComb*, 166 F. 2d 932 (C. A. 8); *Harris v. Hammond*, 145 F. 2d 333 (C. A. 5), certiorari denied, 324 U. S. 859; and *Brown v. Minngas Co.*, 51 F. Supp. 363 (D. Minn., 1943).

The Secretary is of the opinion that the tolerance specifically provided by the particularized language of the agricultural exemptions need not be broadened to accomplish the purposes of these exemptions, whereas the tolerances permitted in certain other sections are necessary to give substance to those sections.

valid, because the [52] Commissioner of Patents did not cause a proper examination to be made as to the alleged new invention or discovery purportedly defined by said Letters Patent, and, had such examination been made properly, it would have appeared that the applicant for said Letters Patent was not entitled thereto, and said Letters Patent would not have been issued; and said Commissioner of Patents exceeded his legal authority in granting and issuing said Letters Patent.

#### XVII. Invalidity for Aggregation

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the alleged inventions purportedly defined by said Letters Patent and said claims, and each of them, are not in fact inventions or combinations but are mere aggregations of unpatentable and old elements.

#### XVIII. Invalidity for Insufficient Disclosure

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because, for the purpose of deceiving the public, the description and specification filed in the Patent Office by the applicant for said Letters Patent were made to contain less than the whole truth relative to the alleged invention by said applicant; because the patentee and Plaintiff has, since long prior to the filing of this suit, known that said Letters Patent were defective and inoperative, and that all of the claims thereof were and are invalid and void for including more than the ap-

plicant had a right to claim, and because they were and are vague, indefinite, and functional; and because the patentee and Plaintiff has failed to apply for reissue patent and failed to file disclaimers in the manner provided by law with respect to said Letters Patent, and the Plaintiff [53] has purposely refrained from applying for reissue patent and filing disclaimers in an attempt to extend the alleged monopoly of the Letters Patent in suit to cover more than the applicant had a right to claim, and to cover unpatented commodities, all contrary to public policy, public interest, and the law.

#### XIX. Invalidity for Different Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the inventions purportedly covered by said claims are substantially different from any invention indicated, suggested, or described in the original application therefor.

#### XX. Invalidity for Claiming Function and Result

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims is functional; because each of said claims describes the alleged invention in terms of function and result; because each of said claims describes the function of a structure, to the exclusion of any sufficient structural definition; because each of said claims attempts to patent a function or result; because each of said claims employs conveniently functional language at the exact point of alleged novelty; and

because each of said claims is but an inaccurate suggestion of the functions of the structure purported to be defined.

### XXI. Invalidity for Exhausted Combination

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims includes more than the applicant had a right to claim and more than was invented, and each of said claims defines an old combination of elements, whereas the invention [54] (if any were involved) resided in the improvement of only one of said elements, or less than all of said elements, of an old combination whose construction, operation, and result were otherwise unchanged.

### XXII. Laches and Estoppel

Plaintiff, since long prior to the filing of this suit, has had full knowledge of the devices sold by this Defendant and complained of as an infringement herein, but delayed the filing of this suit, whereby Plaintiff is guilty of such laches and has permitted this Defendant, and those acting in concert with it, to rely upon the lack of activity by, and laches of, the Plaintiff, so that Plaintiff is estopped to maintain this action and to recover any damages or injunctive relief against this Defendant.

### XXIII. Non-Infringement for Limitation by Prior Art

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, not infringed by any act done, or intended to be done,

by this Defendant, because, in view of the prior art existing at and before the date of the alleged invention of the subject matter of each of said claims, said claims, and each of them, cannot be given an interpretation, meaning, or scope to cover or include any devices sold by this Defendant without rendering such claim or claims invalid as covering or embracing that which was old and well known prior to said alleged invention subjection of said patent.

#### XXIV. File Wrapper Estoppel

While the application for said United States Letters Patent No. 2,286,479 was pending in the Patent Office, the applicant therefor so limited and confined the claims of said application, under the requirements of the Commissioner of Patents or [55] otherwise, that Plaintiff cannot now seek or obtain a construction of any of the claims of said Letters Patent sufficiently broad to cover any devices sold by this Defendant.

Wherefore, Defendant Air-Maze Corporation prays:

(1) That United States Letters Patent No. 2,286,479, and each of the claims thereof, be declared not infringed by any act of this Defendant;

(2) That, as a protection to this Defendant against future suit thereon and as a protection to the public at large from suit on invalid patents, United States Letters Patent No. 2,286,479, and each of the claims thereof, be held invalid, void, and unenforceable, and that a declaratory judgment to such effect be made and entered herein;

(3 That Plaintiff's Complaint be dismissed with prejudice; and

(4) That this Defendant have judgment against Plaintiff for costs herein and attorneys' fees, and such other and further relief as to the Court may seem meet and just.

Dated: At Los Angeles, California, this 24th day of July, 1950.

OVERTON, LYMAN, PLUMB, PRINCE  
& VERMILLE—CARL J. SCHUCK,  
HARRIS, KIECH, FOSTER & HARRIS  
WARD D. FOSTER,  
FORD HARRIS, JR.,

/s/ By FORD HARRIS, JR.,

Attorneys for Defendants.

[Endorsed]: Filed July 28, 1950. [56]

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[Title of District Court and Cause]

FIRST AMENDED ANSWER OF DEFEND-  
ANTS, JULES D. GRATIOT AND AIR-  
MAZE CORPORATION

Defendants, Jules D. Gratiot and Air-Maze Corporation, for their answer to the Complaint herein, admit, deny, and allege as follows:

I. Jurisdiction

Answering Paragraph I of the Complaint, Defendants admit the allegations thereof.



## II. Plaintiff

Answering Paragraph II of the Complaint, Defendants state that they are without knowledge or information sufficient to form a belief as to the truth of any of the averments thereof. [88]

## III. Defendant Jules D. Gratiot

Answering Paragraph III of the Complaint, Defendant Jules D. Gratiot admits the allegations thereof.

## IV. Defendant Air-Maze Corporation

Answering Paragraph IV of the Complaint, Defendant Air-Maze Corporation admits that it is a corporation organized and existing under the laws of the State of Delaware; and Defendants deny each and every other allegation thereof.

## V. Title to Patent

Answering Paragraph V of the Complaint, Defendants admit that on June 16, 1942, United States Letters Patent No. 2,286,479 were issued to Morrill N. Farr; deny that said Letters Patent were duly or legally issued; deny that said Letters Patent were issued for an invention in an Air Filter Panel or for any other invention; and state that they are, and each of them is, without knowledge or information sufficient to form a belief as to the truth of each and every of the other averments of said paragraph.

## VI. Infringement by Defendant Jules D. Gratiot

Answering Paragraph VI of the Complaint, Defendant Jules D. Gratiot denies, and Defendant

Air-Maze Corporation upon information and belief denies, each and every allegation thereof.

#### VII. Infringement by Defendant Air-Maze Corporation

Answering Paragraph VII of the Complaint, Defendant Air-Maze Corporation denies, and Defendant Jules D. Gratiot upon information and belief denies, each and every allegation thereof. [89]

#### VIII. Notice

Answering Paragraph VIII of the Complaint, Defendants state that they are, and each of them is, without knowledge or information sufficient to form a belief as to the truth of any of the allegations thereof.

As additional and separate defenses, defendants allege as follows:

#### IX. Non-Infringement

Defendants have not, and neither of them has, within six (6) years preceding the filing of the Complaint herein and prior to the filing thereof, done any act or thing, or threatened to do any act or thing, infringing any of the claims of United States Letters Patent No. 2,286,479.

#### X. Invalidity for Non-Compliance with R.S. 4886

The alleged invention or discovery claimed in United States Letters Patent No. 2,286,479 was not patentable to the alleged inventor named therein, under the provisions of Section 4886 of the Revised Statutes of the United States (35 U.S.C.

31), and, therefore, said patent is, and all of its claims are, invalid and void.

## XI. Invalidity for Lack of Novelty

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because each of the alleged inventions described thereby was patented and described in printed publications in this and foreign countries before the alleged invention or discovery thereof by the applicant for said patent, or more than two (2) years prior to the filing of the [90] application for said patent, such patents and publications including the following:

U.S. Patent No.	Patentee	Date Granted
438,464	B. S. Benson.....	October 14, 1890
569,203	T. B. Hunt.....	October 13, 1896
838,602	J. Zellweger.....	December 18, 1906
913,802	A. H. Barker.....	March 2, 1909
1,118,237	E. D. St. Cyr.....	November 24, 1914
1,262,317	J. H. V. Finney, et al.....	April 9, 1918
1,267,023	U. Wedge.....	May 21, 1918
1,548,839	P. P. Henshall.....	August 11, 1925
1,566,088	O. V. Greene.....	December 15, 1925
1,576,121	J. J. Preble.....	March 9, 1926
1,729,135	H. W. Slauson.....	Septmeber 24, 1929
1,756,758	F. S. Orem.....	April 29, 1930
1,794,115	L. Klaff.....	February 24, 1931
1,834,534	W. L. Richards, et al.....	December 1, 1931
1,841,250	T. Merryweather.....	January 12, 1932
1,948,363	J. B. Taylor.....	February 20, 1934
1,949,205	G. E. Herring, et al.....	February 27, 1934
2,019,186	H. S. Kaiser.....	October 29, 1935
2,065,871	W. Rehfus.....	December 29, 1936
2,079,297	F. Manning.....	May 4, 1937
2,108,283	R. L. Drew, et al.....	February 15, 1938
2,162,805	M. N. Farr.....	June 20, 1939

British Patent No.	Patentee	Date Granted
17,971	Vollman .....	1902
182,201	Graefe .....	1921
10,583	Grove .....	1899
125,691	Barclay .....	1918
234,516	Budil .....	1925
197,939	Budil .....	1923
24,467	Kirkham, Hulett & Chandler Ltd.....	1904
6,452	Heenan .....	1909
6,850	Defays .....	1905
12,659	Redman .....	1904
13,222	Row .....	1904
23,546	Burstall .....	1907
23,789	Whittaker & Co.....	1912
24,382	Whittaker & Co.....	1912
28,656	Heenan .....	1909
211,756	Moller .....	1923
264,896	Dine .....	1925
311,831	Aivaz .....	1927
324,034	Schrempp .....	1928

French Patent No.	Patentee	Date Granted
667,362	Saulny .....	1929
737,636	Heather .....	1932
739,956	Niestle .....	1932
803,101	Basset .....	1936
808,696	C. F. Burgess Laboratories.....	1936

Swiss Patent No.	Patentee	Date Granted
142,432	Benteli-Hussy .....	1930
181,200	Sulzer .....	1936

German Patent No.	Patentee	Date Granted
175,579	Defays, et al.....	1906
472,749	L'Air Liquide .....	1929
526,256	Richter .....	1931
537,186	Deutsche Luftfilter .....	1931
539,171	Deutsche Luftfilter .....	1929
567,012	Schrempp .....	1932

and others, of which Defendants are not at present advised, but beg leave to add hereto by proper amendment to this, their First Amended Answer,

together with details thereof when such information is obtained.

## XII. Invalidity for Lack of Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions or discoveries purportedly described and claimed in said claims were merely the result of the exercise of the ordinary faculties of reasoning aided by the special knowledge and facility of manipulation which are acquired through the habitual and intelligent practice of the art, and were not the result of that inventive faculty which it is the purpose of the Constitution and the Patent Laws to encourage and reward, and involve nothing more than the exercise of mere mechanical skill in view of the state of the art as known at the time of, and long prior to, the alleged inventions or discoveries thereof by the applicant for said Letters Patent, said state of the art including the prior patents and publications referred to in the preceding section and the instances of prior knowledge, prior invention, and prior public use and sale referred to in Paragraphs XIII, XIV, and XV hereof and the subject matter of such instances.

## XIII. Invalidity for Prior Knowledge and Use

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions purportedly defined by said claims were known [93] to, or used by, others in the United States prior to the alleged inventions or discoveries thereof by the ap-

plicant therefor, including those inventors named in the prior patents and the assignees named in said patents, residing at the residences in this country stated in said patents, such use occurring at such residences, set forth in Paragraph XI hereof, and including the following:

U. S. Patent No. 2,252,242. Patentee, Everett N. Wood. Date of Patent, August 12, 1941. Name and Residence of Person Having Prior Knowledge and Use, As stated in patent. Place of Use, Patentee's residence.

U. S. Patent No. 2,286,480. Patentee, Morrill N. Farr. Date of Patent, June 16, 1942. Name and Residence of Person Having Prior Knowledge and Use, As stated in patent. Place of Use, Los Angeles, California.

Name and Residence of Person Having Prior Knowledge and Use	Place of Use
Richard S. Farr,	
Los Angeles, California.....	Los Angeles, California
M. Spencer Farr	
Los Angeles, California.....	Los Angeles, California
Personnel of Safeway Stores	
Barstow, California.....	Barstow, California
Mohler Brothers	Security Bldg.
2280 White Avenue	1131 N. Highland Avenue
Pasadena, California.....	Los Angeles, California
J. G. Ridland	
147 N. Irving	147 N. Irving
Los Angeles, California.....	Los Angeles, California
Electrical Equipment Co.	
424 N. Central Avenue	424 N. Central Avenue
Phoenix, Arizona.....	Phoenix, Arizona
Personnel of Safeway Stores	
Canoga Park, California.....	Canoga Park, California
Personnel of Safeway Stores	
Indio, California.....	Indio, California
Personnel of Safeway Stores	
Blythe, California.....	Blythe, California
Personnel of Safeway Stores	
Palm Springs, California.....	Palm Springs, California

Name and Residence of Person Having Prior Knowledge and Use	Place of Use
Robert R. Roth 826 N. Third Avenue Phoenix, Arizona.....	Phoenix, Arizona
Bernard W. Keller P. O. Box 456 Barstow, California.....	Barstow, California
John Doe Thaxter Safeway Stores Los Angeles, California.....	Los Angeles, California
J. D. Pringle Safeway Stores Los Angeles, California.....	Los Angeles, California
Arthur Park Bramble Const. Co. Los Angeles, California.....	Los Angeles, California
J. F. Butler Bramble Const. Co. Palm Springs, California.....	Palm Springs, California
F. J. Head 6015 W. 86th Street Los Angeles, California.....	Los Angeles, California
Max Knapp Safeway Stores Canoga Park, California.....	Canoga Park, California
Emerson Eames 1143 Diamond Avenue Pasadena, California.....	Pasadena, California

together with all vendees of devices constructed according to said United States Letters Patent No. 2,286,480, which devices were sold by M. N. Farr & Sons, the employees of the purchasers of such devices hereinbefore listed, and the individuals who installed and serviced such devices, all of whose names and addresses are better known to Plaintiff herein than to these [96] Defendants, but whose names and addresses these Defendants seek leave to insert by amendment herein when ascertained.

## XIV. Invalidity for Prior Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the applicant for said Letters Patent was not the original or first inventor of any material or substantial part of the things purported to be patented thereby, and the same thing or things in all material and substantial respects had, prior to the alleged inventions or discoveries thereof by said applicant, been invented (if there be any patentable invention defined by any of said claims) by others, including the applicants for the patents set forth in Paragraph XI hereof, residing at the places of residence stated in said patents, and the following:

U. S. Patent No. 2,252,242; Patentee, Everett N. Wood; date granted, Aug. 12, 1941; date application filed, Feb. 13, 1939; place of residence, as stated in the patent; and others whose names and addresses are not at present known to these Defendants, but which Defendants pray leave to add hereto by proper amendment to this First Amended Answer when ascertained.

## XV. Invalidity for Prior Public Use and Sale

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions purportedly defined by said claims were in public use or on sale in this country for more than two (2) years prior to the application therefor, such sales being made by the following [97] vendors to the following



vendees, whose names and addresses are hereinafter set forth:

## Vendor—Address

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

## Vendee—Address

Safeway Stores  
Barstow, California

Mohler Brothers  
2280 White Avenue  
Pasadena, California

J. G. Ridland  
147 N. Irving  
Los Angeles, California

Electrical Equipment Co.  
424 N. Central Avenue  
Phoenix, Arizona

Safeway Stores  
Canoga Park, California

Safeway Stores  
Palm Springs, California

Safeway Stores  
Blythe, California

Safeway Stores  
Indio, California

## XVI. Invalidity for Non-Compliance with R.S. 4888

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because said [98] claims fail to comply with Section 4888 of the Revised Statutes of the United States (35 U.S.C. 33) in failing to point out particularly and claim distinctly the part, improvement, or combination which the applicant for said Letters Patent claimed in his invention or discovery, and because such applicant failed to file in

the Patent Office a written description of said invention (if any there were) and of the manner and process of making, constructing, compounding, and using it in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention appertains or with which it is most nearly connected to make, construct, compound, and use the same, and said Letters Patent are ambiguous, and each of the claims thereof is nebulous.

#### XVII. Invalidity for Improper Examination

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the Commissioner of Patents did not know that the device of United States Letters Patent No. 2,286,480 was the subject of invention prior to the alleged invention of the device sought to be patented in said United States Letters Patent No. 2,286,479, and was the subject of prior knowledge and use by others in this country prior to the alleged invention of the subject matter of said Letters Patent, and was the subject of public use and sale in this country for more than two (2) years prior to the application for said Letters Patent, and did not cause a proper examination to be made as to the alleged new invention or discovery purportedly defined by said Letters Patent, and, had such examination been made properly, it would have appeared that the applicant for said Letters Patent was not entitled thereto, and said Letters Patent would not have been issued; and said Commissioner of Patents exceeded his legal authority in granting and issuing said Letters Patent. [99]

## XVIII. Invalidity for Aggregation

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the alleged inventions purportedly defined by said Letters Patent and said claims, and each of them, are not in fact inventions or combinations but are mere aggregations of unpatentable and old elements.

## XIX. Invalidity for Insufficient Disclosure

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because, for the purpose of deceiving the public, the description and specification filed in the Patent Office by the applicant for said Letters Patent were made to contain less than the whole truth relative to the alleged invention by said applicant; because the patentee and Plaintiff have, since long prior to the filing of this suit, known that said Letters Patent were defective and inoperative, and that all of the claims thereof were and are invalid and void for including more than the applicant had a right to claim, and because they were and are vague, indefinite, and functional; and because the patentee has failed to apply for reissue patent and failed to file disclaimers in the manner provided by law with respect to said Letters Patent, and the patentee has purposely refrained from applying for reissue patent and filing disclaimers in an attempt to extend the alleged monopoly of the Letters Patent in suit to cover more than the applicant had a right to claim, and to cover unpatented commodities, all contrary to public policy, public interest, and the law.

**XX. Invalidity for Different Invention**

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because [100] the inventions purportedly covered by said claims are substantially different from any invention indicated, suggested, or described in the original application therefor.

**XXI. Invalidity for Claiming Function and Result**

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims is functional; because each of said claims describes the alleged invention in terms of function and result; because each of said claims describes the function of a structure, to the exclusion of any sufficient structural definition; because each of said claims attempts to patent a function or result; because each of said claims employs conveniently functional language at the exact point of alleged novelty; and because each of said claims is but an inaccurate suggestion of the functions of the structure purported to be defined.

**XXII. Invalidity for Exhausted Combination**

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims includes more than the applicant had a right to claim and more than was invented, and each of said claims defines an old combination of elements, whereas the invention (if any were involved) resided in the improvement of only one of said elements, or less than all of said elements, of an old combination whose

construction, operation, and result were otherwise unchanged.

### XXIII. Laches and Estoppel

Plaintiff, since long prior to the filing of this suit, has had full knowledge of the devices sold by these Defendants and complained of as an infringement herein, but delayed the filing of this suit, whereby Plaintiff is guilty of such laches and has [101] permitted these Defendants to rely upon the lack of activity by, and laches of, the Plaintiff, so that Plaintiff is estopped to maintain this action and to recover any damages or injunctive relief against these Defendants.

### XXIV. Non-Infringement for Limitation by Prior Art

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, not infringed by any act done, or intended to be done, by these Defendants, because, in view of the prior art existing at and before the date of the alleged invention of the subject matter of each of said claims, and including the prior public use and public knowledge and instances of public use and sale of the humidifier and air filter devices by the persons and at the places listed in Paragraphs XIII and XV hereof, said claims, and each of them, cannot be given an interpretation, meaning, or scope to cover or include any devices sold by these Defendants without rendering such claim or claims invalid as covering or embracing that which was old and well known prior to said alleged invention subject to said patent.

## XXV. File Wrapper Estoppel

While the application for said United States Patent No. 2,286,479 was pending in the Patent Office, the applicant therefor so limited and confined the claims of said application, under the requirements of the Commissioner of Patents or otherwise, that Plaintiff cannot now seek or obtain a construction of any of the claims of said Letters Patent sufficiently broad to cover any devices sold by these Defendants.

## XXVI. Invalidity for Lack of Inventive Advance

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid because of the [102] prior knowledge and use and the prior public use and prior public sale, earlier than the alleged invention of the subject matter of the Letters Patent in suit or more than two (2) years prior to the application therefor, as hereinbefore set forth, of that which was attempted to be patented in said Letters Patent or that which was so nearly like that which was so attempted to be patented as not to be distinguished therefrom by invention thereover.

## XXVII. Abandonment

The invention of the device accused as infringing Letters Patent No. 2,286,479 in suit (if there be any invention in such device), all rights to a patent thereon, and claims of the patentee, Morrill N. Farr, of said Letters Patent which might define Defendants' said accused device were abandoned by the said Morrill N. Farr and Plaintiff in the United States Patent Office, such acts of abandonment in-

cluding the following acts, events, and circumstances:

On July 22, 1939, Morrill N. Farr, the patentee of United States Letters Patent No. 2,286,479, filed in the United States Patent Office an application, Serial No. 285,904, for new and useful improvements in "Filters"; this application disclosed, described, and claimed a filter similar to the device made by Defendant Air-Maze Corporation, and accused herein as an infringing device; on October 7, 1939, the United States Patent Office rejected all of the claims of the above-mentioned patent application Serial No. 285,904; thereafter, all of the subject matter disclosed, defined, and claimed in the above mentioned application Serial No. 285,904 became abandoned for failure to prosecute the same before the United States Patent Office save for a single form of the device which was disclosed, described, and claimed in an application, Serial No. 327,833, filed April 4, 1940, for "Air Filter Panel", which resulted in United States Letters Patent No. 2,286,479 in suit, which was designated as a continuation of the above mentioned application Serial No. 285,904; and the description, disclosure, and claims relating to that form of filter like the accused device of Defendants herein was not transferred and continued from said abandoned application Serial No. 285,904 to the said continuation application Serial No. 327,833 but instead, that form of filter disclosed by Morrill N. Farr in Serial No. 285,904 and corresponding to the filter of Defendants accused in this action as infringement, was

abandoned, and no attempt was made thereafter by Morrill N. Farr to secure Letters Patent of the United States covering said abandoned disclosure.

### XXVIII. Intervening Rights

Plaintiff is estopped to assert infringement of said United States Letters Patent No. 2,286,479 by the devices made, used, or sold by these Defendants by reason of the fact that Plaintiff for a long period of time failed to assert any claim of infringement against these Defendants, and that Plaintiff never asserted a scope of the claims of said Letters Patent such as to cover the devices of Defendants herein complained of, until Defendant Air-Maze Corporation had made and sold large numbers of these devices, and by reason of the fact that said Morrill N. Farr and Plaintiff abandoned the invention of the Defendants' devices accused herein as infringing the Letters Patent in suit (if such devices involved any such invention) and all rights to a patent thereon and all rights to an interpretation of any claims of the patent in suit covering such devices by those acts set forth, and those events and circumstances set forth, in Paragraph XXVII hereof and hereby incorporated herein by reference; and these Defendants are therefore entitled to assert intervening rights against Plaintiff because of large investments made for the [104] manufacture, marketing, and sale of these devices during that period of time when Plaintiff was failing to assert the enlarged scope of the claims of said United States Letters Patent No. 2,286,479 for which Plaintiff is now contending.



Wherefore, Defendants pray:

(1) That United States Letters Patent No. 2,286,479, and each of the claims thereof, be declared not infringed by any act of these Defendants;

(2) That, as a protection to these Defendants against future suit thereon and as a protection to the public at large from suit on invalid patents, United States Letters Patent No. 2,286,479, and each of the claims thereof, be held invalid, void, and unenforceable, and that a declaratory judgment to such effect be made and entered herein;

(3) That Plaintiff's Complaint be dismissed with prejudice; and

(4) That these Defendants have judgment against Plaintiff for costs herein and attorneys' fees, and such other and further relief as to the Court may seem meet and just.

Dated: At Los Angeles, California, this 4th day of September, 1951.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN &  
DORAN, GEORGE S. BALDWIN  
HARRIS, KIECH, FOSTER &  
HARRIS

WARD D. FOSTER, FORD HARRIS, JR., DONALD C. RUSSEL

/s/ By FORD HARRIS, JR.

Attorneys for Defendants. [105]

[Endorsed]: Filed Sept. 17, 1951.

[Title of District Court and Cause]

# PLAINTIFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW AND JUDGMENT

Plaintiff submits the attached Findings of Fact and Conclusions of Law in place of those previously submitted in order to incorporate such of the objections and suggestions of defendants as are believed proper.

Findings 10, 11, 12 and 13 have been amended as suggested by defendants. Findings 19 and 23 and Conclusions of Law 3 and 5 have been amended as suggested by defendants. [106]

Defendants have proposed an addition to Finding 14 but this addition does not add any material fact to our proposed Finding 14.

Defendants proposed additional Finding 24 is believed improper for the reason that the evidence at the trial showed that Plaintiff's Exhibits 19, 20 and 21 were not air filters made and sold by Air-Maze Corporation but merely experimental models of air filters being tested in the Air-Maze laboratories.

Defendants proposed Finding 25 is believed incorrect the claims referred to not specifically reciting defendants' accused P-5 filter panel.

We have also revised our proposed Judgment in order to remove any award of attorneys fees. [107]

## FINDINGS OF FACT AND CONCLUSIONS OF LAW

This cause having come on to be heard before the Court, at the conclusion of the trial and of the oral

arguments presented on January 4, 1952, the Court having expressed its conclusion and opinion, the same by reference, together with and supplemented by the following Findings of Fact and Conclusions of Law, are hereby adopted by the Court as its Findings of Fact and Conclusions of Law pursuant to Rule 52 of the Rules of Civil Procedure: [108]

### Findings of Fact

1. The plaintiff, Farr Company, is a California corporation having its principal place of business in the City of Los Angeles, California, and is the owner of the entire right, title and interest in and to United States Letters Patent No. 2,286,479, claims 4, 5, 7 and 8 of which are in suit.

2. The defendant Jules D. Gratiot, is a resident of Los Angeles, California, and the defendant Air-Maze Corporation, is a Delaware corporation doing business within the Southern District of California, Central Division.

3. The Farr patent in suit discloses an air filter panel operating on the principle of impingement of particles on collecting surfaces, which collecting surfaces are wire screen members position so that the air is introduced along the planes of the members, and the wire screen members are corrugated to divide the panel in two dimensions into passages through the panel, which passages change abruptly in direction.

4. At the start of the operation of the air panels of the patent in suit portions of the air flow through the mesh of the screen members into the adjoining passages but as the panels become loaded with dust

the flow of air becomes more and more confined to flow through the passages.

5. Prior to the advent of the invention of the Farr patent in suit for many years there had been in commercial use air filter panels made of wire screen positioned so that the air was introduced perpendicular to the plane of the wire screens, and there had also been in commercial use for many years air filters made of paper positioned so that the air was [109] introduced along the planes of the paper but none of such air filters have the mode of operation or achieve the advantages of the Farr patent in suit.

6. The air filter panels of the Farr patent in suit combined the ability to provide a high efficiency in removing dust from air with a lower pressure drop than previous commercially built filters which pressure drop did not increase as rapidly as previously built commercial filters as the filter became loaded with dust, the air filter panel of the Farr patent in suit providing the further advantages of low cost of manufacture and low maintenance as well as ease of cleaning.

7. The public has recognized the value of the air filter panels of the Farr patent in suit. Beginning substantially immediately with the invention of the patent in suit the air filter panels of the Farr patent in suit have gone into commercial use at a steady and rapidly increasing rate, the patent in suit having a wide commercial success and being responsible for the development of a rapidly expanding business by the plaintiff, Farr Company.

8. The air filter panel described and covered by claims 4, 5, 7 and 8 of the Farr patent in suit is not disclosed in any of the prior art or prior uses pleaded and introduced in evidence by the defendants.

9. The Farr patent in suit does not disclose an aggregation but does disclose a new combination of old elements which co-operate together to provide not only advantages in the cleaning of the air but benefits in cost of manufacture, maintenance and upkeep. [110]

10. Devices shown in prior art patents such as Patent No. 2,252,242 to Wood, Defendants' Exhibit B, Tab 11; British Patent No. 24,467 to Kirkham, Defendants' Exhibit B, Tab 12; British Patent No. 13,222 to Row, Defendants' Exhibit B, Tab 13; and British Patent No. 211,756 to Moller, Defendants' Exhibit B, Tab 14, in which liquid is supplied continuously or intermittently so as to wash away any dust collected, are not filter panels operating on the principle of impingement of particles on collecting surfaces and do not remove dust by the same mode of operation referred to in Finding 4, or achieve the advantages of the Farr patent in suit.

11. Devices shown in the prior art patents such as Patent No. 1,729,135 to Slauson, Defendants' Exhibit B, Tab 5; Patent No. 2,019,186 to Kaiser, Defendants' Exhibit B, Tab 8; Patent No. 2,079,297 to Manning, Defendants' Exhibit B, Tab 9; Patent No.

2,252,242 to Wood, Defendants' Exhibit B, Tab 11; British Patent No. 211,756 to Moller, Defendants' Exhibit B, Tab 14, and French Patent No. 739,956 to Niestle, Defendants' Exhibit B, Tab 15, which employ solid sheets of material such as paper or mesh material which, when oiled and in use present a solid wall, do not possess the mode of operation referred to in Finding 4 or achieve the advantages of the Farr Letters Patent in suit.

12. Patent No. 1,118,237 to St. Cyr, Defendants' Exhibit B, Tab 1, discloses a gaseous fuel mixer and does not constitute an air filter panel which operates by the impingement of particles on collecting surfaces. The device of the St. Cyr patent is made with a fine metal gauze the crimps of which change direction only slowly because of the spiral wrapping of the gauze and do not provide passages which change abruptly in direction [111] as in the Farr patent in suit. The device of the St. Cyr patent is continually washed with a gaseous fuel mixture and is entirely enclosed. The device of the St. Cyr patent is not adapted to perform by the same mode of operation referred to in Finding 4 or achieve the advantages of the device of the Farr patent in suit.

13. The device of the French Patent No. 739,956 to Niestle, Defendants' Exhibit B, Tab 15, is a filter made of expanded sheets set at right angles to the intended flow of air rather than parallel as in the Farr patent in suit. When made of metal gauze and oiled the expanded sheets would present a solid wall. The French patent to Niestle does not operate by

the same mode of operation referred to in Finding 4 or achieve the advantages of the Farr patent in suit.

14. For many years prior to the invention of the Farr patent in suit the art, although familiar with air filters made of wire screen such as illustrated in Patent No. 1,566,088 to Greene, Defendants' Exhibit B, Tab 3, and paper filters such as illustrated in Patent No. 2,019,186 to Kaiser, Defendants' Exhibit B, Tab 8, and Patent No. 2,079,297 to Manning, Defendants' Exhibit B, Tab 9, expended great effort and money in the scientific study and testing of different air filter panels without the air filter panel of the Farr patent being suggested thereby.

15. The marked commercial success of the Farr patent in suit and the failure of the prior art to produce an air filter having the mode of operation or achieving the advantages of the Farr patent in suit, while not sufficient alone to establish invention is an important factor to support the conclusion that the combination of the claims 4, 5, 7 and 8 of the Farr patent in suit represents an invention and not mere mechanical skill. [112]

16. Prior to and at the time of the filing of the bill of complaint herein defendant Jules D. Gratiot was doing business within the Southern District of California, Central Division, by selling the P-5 air filter panels manufactured by the defendant Air-Maze Corporation, which P-5 air filter panels are like Plaintiff's Exhibit 12 and described and illustrated in Plaintiff's Exhibit 4.

17. That the activities of the defendant Jules D. Gratiot in selling the P-5 air filter panels manufactured by defendant Air-Maze Corporation, were more than a mere solicitor of sales, and the defendant Air-Maze Corporation was doing business within this District.

18. That the defendant Air-Maze Corporation has conducted the entire defense of this case, has hired the attorneys who have conducted the defense for both defendants, has exclusively controlled the progress of this litigation, has agreed to pay all expenses of the defense of this suit including attorneys' fees and costs, and has agreed to indemnify the defendant Jules D. Gratiot from any damage resulting from any judgment against said Jules D. Gratiot.

19. The said P-5 air filter panels manufactured by the defendant Air-Maze Corporation and sold by the defendant Jules D. Gratiot are essentially and basically the same as the air filter panels of the Farr patent in suit.

20. Said P-5 air filter panel introduces the air along the plane of the filtering elements, breaks the air up into passages having abrupt angles creating turbulence in the air to force the air through the mesh of the screen. [113]

21. Claims 1, 2, 3 and 6 of the patent in suit are expressly limited to the use of flat screen wire between the corrugated or crimped screen wire while claims 4, 5, 7 and 8 of the Farr patent in suit are not limited to the use of such flat screen wire and



were not intended by the Patent Office or by the patentee Farr to be so limited.

22. Claims 4, 5, 7 and 8 of the Farr patent in suit are not limited, and were not intended by the Patent Office or the patentee Farr to be so limited, to the use of crimped wire screen all of which had the angles of the crimp extending in the same direction.

23. The filing of the application Serial No. 327,833 which issued into the Farr patent in suit as a continuation of the earlier application Serial No. 285,904 did not abandon any of the forms of air filter shown in application Serial No. 285,904 and the file wrappers of applications Serial Nos. 285,904 and 327,833 do not contain any abandonment or estoppel such as would prevent claims 4, 5, 7 and 8 of the Farr patent in suit from including the said P-5 air filter panels manufactured by the defendant Air-Maze Corporation and sold by the defendant Jules D. Gratiot.

### Conclusions of Law

I. The Farr Letters Patent in suit No. 2,286,479 was duly and legally issued on June 16, 1942 and plaintiff Farr Company is the owner of the entire right, title and interest in and to the said Letters Patent with any and all rights of action, claims or demands arising out of or accruing from past infringement thereof. [114]

II. Claims 4, 5, 7 and 8 of the Farr Letters Patent in suit are good and valid in law and cover a new and meritorious invention.

III. Defendant Jules D. Gratiot by the sale of the P-5 air filter panels, and the defendant Air-Maze Corporation by the manufacture and sale of the said P-5 air filter panels exemplified by Exhibit 12, have infringed each of Claims 4, 5, 7 and 8 of the Farr Letters Patent in suit No. 2,286,479.

IV. That the defendant, Air-Maze Corporation, for venue purposes, is a resident of the Southern District of California, Central Division.

V. The plaintiff is entitled to a judgment for an injunction and accounting with costs as prayed for in the bill of complaint herein filed.

VI. That the accounting should be stayed pending appeal by defendants from the judgment entered herein and until said appeal is determined, dismissed, or until the time for such appeal has lapsed.

/s/ PEIRSON M. HALL,

United States District Judge.

Dated Feb. 26, 1952

Approved as to form as provided in Rule 8.

LYON & LYON

/s/ By RICHARD F. LYON,

Attorneys for Plaintiff. [115]

[Endorsed]: Filed Feb. 26, 1952.

In the United States District Court, Southern  
District of California, Central Division

Civil Action No. 9759-PH

FARR COMPANY, a corporation,

Plaintiff,

vs.

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,

Defendants.

### JUDGMENT

This cause having come on to be heard and the Court having made and entered its Findings of Fact and Conclusions of Law pursuant to Rule 52 of the Rules of Civil Procedure, It Is Hereby Adjudged and Decreed as follows:

(1) Plaintiff is the owner of the entire right, title and interest in and to Letters Patent No. 2,286,479 granted June 16, 1942, to Morrill N. Farr for Air Filter Panel, together with all rights of action for past infringement thereof. [117]

(2) That said Letters Patent and Claims 4, 5, 7 and 8 thereof are good and valid in law.

(3) That plaintiff have judgment on its complaint for infringement of Letters Patent No. 2,286,479 as prayed for.

(4) That a perpetual injunction issue out of and under the seal of this Court restraining the defendant Jules D. Gratiot, his officers, agents, servants,

employees and attorneys, and those persons in active concert or participation with him, and the defendant Air-Maize Corporation, its officers, agents servants, employees and attorneys, and those persons in active concert or participation with it, from making, using or selling or causing to be made, used or sold, or offering or threatening to make, use or sell, or contributing to the manufacture, use or sale of the air filter panels patented in and by said Letters Patent No. 2,286,479, and particularly claims 4, 5, 7 and 8 thereof, reading as follows:

“4. A filtering panel operating on the principle of impingement of particiles on collecting surfaces, which includes a plurality of mesh screening members extending in the general direction of the intended flow of the medium to be filtered, said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered, thereby forming passages extending through said filter, the walls of which passages are composed of such mesh members, said passages changing direction, whereby the medium may flow through the mesh of said members near the entrance of the panel when the filter is clean and partially through said passages and thence through the mesh of the members located progressively towards the exit of the panel as the panel becomes progressively loaded with particles.

5. A filtering panel operating on the principle of

impingement of particles on collecting surfaces, which includes a plurality of sheets of crimped mesh screening members positioned with the sheets extending in the general direction of the intended flow through the panel of the medium to be filtered, the crimp of said sheets being constructed and arranged to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered, thereby forming passages the walls of which are composed of such mesh members, which passages extend through said panel and a portion of each of said passages being disposed angularly with respect to a remaining portion of the passages.

7. An air filtering panel operating on the principle of impingement of particles on a collecting surface, which panel includes mesh screening members constructed and arranged to form passages extending through the panel of relatively large size as compared with the openings in said mesh members, said passages subdividing the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered and being so constructed and arranged that as the mesh members becomes progressively clogged the medium to be filtered may flow through such passages and encounter unclogged openings in said mesh members, said passages changing in direction. [119]

8. An air filtering panel operating on the principle of impingement of particles on a collecting surface, which panel includes mesh screening mem-

bers constructed and arranged to form passages extending through the panel of relatively large size as compared with the openings in said mesh members, said passages subdividing the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered and being so constructed and arranged that as the mesh of the members becomes progressively clogged the medium to be filtered may flow through such passages and encounter unclogged openings in said mesh members, said passages changing abruptly in direction."

and from in any way infringing upon said Letters Patent or upon the rights of the plaintiff under said Letters Patent.

(5) That plaintiff recover from defendants general damages which shall be due compensation for making, using and selling the invention not less than a reasonable royalty therefor, together with such costs and interest as may be fixed by the Court.

(6) That this cause be referred to Howard V. Calverley, Esq., as a Special Master, to take and report to the Court an account of the said compensation due plaintiff in this cause.

(7) That plaintiff recover its costs from the defendants in the amount of \$. . . . . to be taxed.

(8) That the accounting and reference for accounting as provided for in Paragraphs (5) and (6) hereof, be stayed pending appeal by defendants of this judgment or for the statutory period of time within which such appeal may be taken and if taken,

until the determination of this cause by the Appellate Court or the dismissal of the said appeal.

/s/ PEIRSON M. HALL,

United States District Judge.

Dated: February 26, 1952.

Approved as to form as provided in Rule 8.

LYON & LYON,

/s/ RICHARD F. LYON,

Attorneys for Plaintiff.

[Endorsed]: Filed February 26, 1952. [121]

[Title of District Court and Cause]

NOTICE OF APPEAL

Notice is hereby given that Jules D. Gratiot and Air-Maze Corporation, defendants above named, appeal to the United States Court of Appeals for the Ninth Circuit from the Judgment entered in this action on the 27th day of February, 1952.

Dated: At Los Angeles, California, this 4th day of March, 1952.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN &  
DORAN, GEORGE S. BALDWIN

HARRIS, KIECH, FOSTER &  
HARRIS

FORD HARRIS, JR.,  
DONALD C. RUSSELL

/s/ By [Illegible]

Attorneys for Defendants. [128]

[Endorsed]: Filed March 4, 1952.



[Title of District Court and Cause.]

ORDER STAYING INJUNCTION  
AND FIXING BOND

This day this cause having come on to be heard upon the motion of defendants, Jules D. Gratiot and Air-Maze Corporation, for stay of injunction pending appeal, and for good cause shown, it is hereby ordered as follows:

It Is Hereby Ordered and Decreed, pursuant to Rule 62, Federal Rules of Civil Procedure, that the injunction ordered to be issued by the Judgment of this Court entered on February 27, 1952, and the issuance and service thereof, be and it is hereby suspended and stayed, pending the determination of the appeal, notice of which was filed in this Court on March 4, 1952, or until further order of this Court, upon condition that the defendants file with the Clerk of this Court on or before March 31, 1952, [123] a good and sufficient bond in the sum of Ten Thousand Dollars (\$10,000.00). The condition of this bond shall be that if Jules D. Gratiot and Air-Maze Corporation shall prosecute their said appeal to effect, or if they fail to make good their said appeal, shall answer all costs adjudged against them by reason thereof and shall pay plaintiff all damages which may be adjudged against defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, from and after the entry of the Judgment on February 27, 1952, until the final decision of the United States Court of Appeals for the Ninth Circuit, then this obligation shall be void; otherwise, the same

shall be and remain in full force and effect; provided, however, that this bond shall not be considered as securing the payment for any damages which may be adjudged against the defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, by reason of any manufacture, use or sale of the enjoined devices prior to the making and entry of said Judgment on February 27, 1952. No separate bond on appeal need be filed under Rule 73(c) of the Rules of Civil Procedure.

Dated: This seventeenth day of March, 1952.

/s/ LEON R. YANKWICH,  
United States District Judge.

Presented by:

HARRIS, KIECH, FOSTER & HARRIS,  
/s/ By FORD HARRIS, JR.,  
Attorneys for Defendants.

Approved as to form:

/s/ LYON & LYON,  
/s/ CHARLES G. LYON,  
Attorneys for Plaintiff.

[Endorsed]: Filed March 17, 1952. [124]

[Title of District Court and Cause]

## BOND ON STAY OF INJUNCTION

Know All Men by These Presents:

That The Travelers Indemnity Company, a Connecticut corporation and duly authorized to do business in the State of California and within the District of the Federal Court above entitled, is held and firmly bound unto Farr Company, a California corporation, plaintiff in the above entitled action, in the sum of Ten Thousand Dollars (\$10,000.00) to be paid to the said plaintiff and for the payment of which well and truly to be made we bind ourselves and our successors in interest firmly by these presents.

Dated this 25th day of March, 1952. [125]

Whereas, the above named Jules D. Gratiot and Air-Maze Corporation, defendants in the above entitled action, have filed a notice of appeal to the United States Court of Appeals for the Ninth Circuit, in the District Court for the Southern District of California, Central Division, from the entire judgment entered in said action on the 27th day of February, 1952.

Now, therefore, the condition of this obligation is such that if the above-named defendants, Jules D. Gratiot and Air-Maze Corporation, shall prosecute their said appeal to effect, or if they fail to make good their said appeal, shall answer all costs adjudged against them by reason thereof and shall pay plaintiff all damages which may be adjudged

against defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, from and after the entry of the judgment on February 27, 1952, until the final decision of the United States Court of Appeals for the Ninth Circuit, then this obligation shall be void; otherwise, the same shall be and remain in full force and effect; provided, however, that this bond shall not be considered as securing the payment for any damages which may be adjudged against the defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, by reason of any manufacture, use or sale of the enjoined devices prior to the making and entry of said judgment on February 27, 1952.

[Seal]      THE TRAVELERS INDEMNITY CO.  
               /s/ By JOHN F. DICKEY,  
                                 Attorney in Fact.

Countersigned by:  
 [Seal]    /s/ F. S. PLEWS,  
                                 California Resident Agent

Premium charge for this bond is \$200.00.

State of California,  
 County of Los Angeles, ss:

On this 25th day of March, in the year 1952, before me, Marguerite Stevens, a Notary Public in and for [126] said County, residing therein, duly commissioned and sworn, personally appeared John F. Dickey, known to me to be the Attorney in Fact of The Travelers Indemnity Company, the corporation described in and that executed the within in-

strument, and also known to me to be the person who executed it on behalf of the corporation therein named, and he acknowledged to me that such corporation executed the same.

In Witness Whereof, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

[Seal]           /s/ MARGUERITE STEVENS  
Notary Public in and for the County of Los Angeles, State of California. My Commission expires June 2, 1955.

Examined and recommended for approval as provided in Rule 8.

/s/ FORD HARRIS, JR.  
Attorney for Defendants.

Approved as to form.

/s/ RICHARD F. LYON,  
Attorney for Plaintiff.

I hereby approve the foregoing.  
Dated this 28th day of March, 1952.

/s/ WM. C. MATHES,  
United States District Judge.

[Endorsed]: Filed March 28, 1952. [127]

[Title of District Court and Cause.]

### CERTIFICATE OF CLERK

I, Edmund L. Smith, Clerk of the United States District Court for the Southern District of California, do hereby certify that the foregoing pages numbered from 1 to 151, inclusive, contain the original Complaint for Infringement of Letters Patent 2,286,479; Summons and Returns of Service; Notice of Motion Under Rule 12(b) of Defendant Air-Maze Corporation to Dismiss the Action, to Quash the Return of Service of Summons for Want of Jurisdiction and Improper Venue; Jurisdictional Affidavit-Corporation Not Doing Business in Jurisdiction; Affidavit of Jules D. Gratiot in Support of Motion to Quash Service of Summons on Air-Maze Corporation and in Support of Motion to Dismiss as to Air-Maze Corporation; Answer of Defendant Jules D. Gratiot to Complaint; Memorandum and Order; Answer of Defendant Air-Maze Corporation to Complaint; Memorandum of Defendant Air-Maze Corporation in Support of Motion to Dismiss the Action and to Quash the Return of Service of Summons for Improper Venue; Stipulation and Order re Amended Answer; First Amended Answer of Defendants Jules D. Gratiot and Air-Maze Corporation; Findings of Fact and Conclusions of Law; Judgment; Order Staying Injunction and Fixing Bond; Bond on Stay of Injunction; Notice of Appeal; Appellants' Statement of Points on Appeal; Appellants' Designation of Record on Appeal; Counter-Designation of Contents of Record

on Appeal and Stipulation and Order Extending Time to Docket Appeal which, together with the original exhibits and copy of Reporter's Transcript of Proceedings on November 28, 29 and 30, December 4, 5, 6, 7, 11, 12 and 19, 1951, January 3 and 4, 1952, transmitted herewith, constitute the record on appeal to the United States Court of Appeals for the Ninth Circuit.

I further certify that my fees for preparing and certifying the foregoing record amount to \$2.80 which sum has been paid to me by appellants.

Witness my hand and the seal of said District Court this 21st day of April, A.D. 1952.

[Seal]                      EDMUND L. SMITH,  
                                    Clerk

s/ By THEODORE HOCKE,  
            Chief Deputy

In the United States District Court, Southern  
District of California, Central Division

Civil—No. 9759—PH

FARR COMPANY, a corporation,  
Plaintiff,  
vs.

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,  
Defendants.

REPORTER'S TRANSCRIPT OF  
PROCEEDINGS

Los Angeles, California, November 28, 1951  
Honorable Peirson M. Hall, Judge Presiding.

Appearances: For the Plaintiff: Lyon & Lyon,  
811 West Seventh St., Los Angeles 14, Calif., by  
Leonard S. Lyon, Esq., and Richard F. Lyon, Esq.,  
and Richard E. Lyon, Esq. [1\*] For the Defend-  
ants: Hyde, Meyer, Baldwin & Doran, 1430 Kieth  
Bldg., Cleveland 15, Ohio, by George S. Baldwin,  
Esq., and Harris, Kiech, Foster & Harris, 417 So.  
Hill St., Los Angeles 13, California, by Ford Harris,  
Jr., Esq.

Los Angeles, California; November 28, 1951,  
3:00 o'clock p.m.

The Court: Farr Company vs. Gratiot.

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\* Page numbering appearing at bottom of page of original Re-  
porter's Transcript of Record.



Mr. Leonard S. Lyon: Yes, your Honor.

\* \* \* \* \* [5]

The Court: I suppose non-certified copies, it is stipulated, may be used?

Mr. Leonard S. Lyon: We have agreed that uncertified copies may be used.

Mr. Harris: That was the informal understanding. We have had no pretrial hearing in the case but my understanding is that uncertified, soft copies of patents and photostatic copies of foreign patents may be used with the same force and effect as certified copies certified by the United States Patent Office.

Mr. Leonard S. Lyon: That applies to both the patent in suit and the prior art.

Mr. Harris: Yes.

The Court: Very well. So stipulated?

Mr. Harris: So stipulated.

Mr. Leonard S. Lyon: So stipulated.

The Court: So ordered.

Mr. Leonard S. Lyon: The filters that we are concerned with in this case, your Honor, are designed and used to remove dust from air. [6]

\* \* \* \* \*

There is one fundamental characteristic of the filters that we are interested in, and that is as stated in the first paragraph of the patent: they are to operate on the impingement principle.

The Court: It says, "by the swirling, baffling, impingement principle."

Mr. Leonard S. Lyon: Yes. The swirling and baffling are two of the things that I am going to

take out of the impingement principle, now, when I explain that.

The Court: All right.

Mr. Leonard S. Lyon: There is another type of filter. I will explain the other type by contrast. The other type of filter is one where you force the air or liquid through holes and those holes are supposed to be smaller than the particles that the filter is going to entrap, and therefore the particles cannot get through the filter and they are separated from the air or the liquid. That is not the impingement principle. That is the other filter principle. [8]

The impingement principle is where you have surfaces that are oiled and where the air comes in contact with those surfaces and the particles adhere to the surfaces. They are not held from moving forward by being bigger than the hole. They just stick.

The Court: The air is brought forcibly into contact with the oiled surface?

Mr. Leonard S. Lyon: Not violently, but by a current of air, by a current of air passing over and in contact, and in contact with the oiled surfaces, the particles collect on the oiled surface and do not follow through with the air. [9]

\* \* \* \* \*

Mr. Leonard S. Lyon: Exhibit No. 1.

The Court: That is the patent in suit.

Mr. Leonard S. Lyon: And the panel I have just exhibited to your Honor as Exhibit No. 2.

(A copy of Patent No. 2,286,479, issued to Morrill N. Farr, June 16, 1942, was marked Plaintiff's Exhibit No. 1 for identification.)

The Court: Exhibit No. 2 is an exemplification of the patent in suit?

Mr. Leonard S. Lyon: That is correct.

(Said panel was marked Plaintiff's Exhibit No. 2 for identification.)

The Court: And is made to the size of what?

Mr. Leonard S. Lyon: The regular commercial size.

The Court: The regular commercial size.

Mr. Leonard S. Lyon: Now, your Honor will see, in the first place, that we start in describing this filter with the fact that it is made out of sheets of—

The Court: Well, you have another thing in your hand. We will call that No. 3 for identification.

Mr. Leonard S. Lyon: I will describe Exhibit No. 3 as being a specimen of the media employed in the commercial patented filter and in Exhibit 2—

This is Exhibit No. 3, now, the last specimen.

The Court: Yes.

(Said specimen was marked Plaintiff's Exhibit No. 3 for identification.) [10]

The Court: The patent is Exhibit No. 1, the big square panel is No. 2, and the little one is No. 3.

The Clerk: Exhibit No. 3.

Mr. Leonard S. Lyon: Now, this patented filter is made of sheets of crimped wire mesh. The holes in this mesh are much larger than any particle that you expect to receive.

The Court: What is the size of the hole?

Mr. Leonard S. Lyon: I think the size is about one-sixteenth.

Mr. S. F. Duncan: 14 mesh.

Mr. Leonard S. Lyon: 14 mesh.

The Court: 14 mesh. 14 to a square inch.

Mr. Leonard S. Lyon: That is right. These sheets are crimped and they have a herringbone structure, that is——

The Court: Crimping?

Mr. Leonard S. Lyon: That is, the crimping forms the sheets into small triangles, a series of small triangles. In the herringbone structure, there is an angle which is added, which changes the direction of the passage.

Now, we start out with the fundamental feature of this construction, that these sheets are arranged, not across the face of the panel, but are arranged parallel to the flow of air through the filter, so that together——

The Court: The air flows across the surfaces rather than through them? [11]

Mr. Leonard S. Lyon: They form a series of channels or passageways, and the air flows down those passageways. [12]

\* \* \* \* \*

The three features of the new patented construction which I want to emphasize, and which are emphasized in the patent in suit, which we will discuss in the evidence, are the fact that we have sheets of crimped wire mesh arranged parallel to the flow of the filter, the formation of the multiple subdivision in the filter in both dimensions, per-

pendicular to the flow through the filter, and then the change in direction in the passageways.

\* \* \* \* \*

Mr. Leonard S. Lyon: We were asked by the defendants to specify the claims in suit by a motion to make more definite.

The court: Which ones were they?

Mr. Leonard S. Lyon: And they filed a catalog of the [15] defendants, and we specified and charged their so-called Air-Maze Type P-5 Air Filter panel with infringement, and we specified that Claims 4, 5, 7 and 8 are charged to be infringed. [16]

Now there has been a prior litigation between the parties in this suit, your Honor. At the time the plaintiff brought out this new patented filter back about 1940 the defendant, the Air-Maze Company of Ohio, was in the business in a very large way. It was making the old-style filter on which it had a patent, and I have a specimen of the old-style Air-Maze filter here, which I will ask to be marked Exhibit No. 5 for identification.

The Court: That is Air-Maze manufacture——

Mr. Leonard S. Lyon: Old style.

The Court: ——old style?

Mr. Leonard S. Lyon: Yes, your Honor.

(The article referred to was marked Plaintiff's Exhibit No. 5 for identification.)

The Court: "Old style," meaning how old?

Mr. Leonard S. Lyon: It has been manufactured for some considerable number of years.

The Court: It was manufactured up to 1940?

Mr. Leonard S. Lyon: Yes. [17]

The Court: Is that your position?

Mr. Leonard S. Lyon: Yes.

Mr. Baldwin: It is still being manufactured, your Honor.

The Court: I see.

Mr. Leonard S. Lyon: Now in this filter the sheets of wire are across the face of the filter and are arranged at right angles to what they are in the patented filter.

The Court: That is to say, they are arranged so that the air flows through the screen rather than along the surface of it?

Mr. Leonard S. Lyon: That is correct.

And the Air-Maze Corporation had a patent on that filter, and they accused the plaintiff in this case, who had just brought out their patented filter that is involved in this case, of infringing that patent.

Judge Yankwich held for the plaintiff in this case against the Air-Maze Corporation, holding there was no infringement, basing his opinion on the fact that there was a marked difference between these filters in that the Air-Maze filter, the old style, did not have the sheets arranged to form passageways, did not have the shades arranged parallel to the flow of the air through the filter, and he dismissed the case.

Whereupon shortly after that the Air-Maze Corporation brought out this copy of the patented filter. Now this case [18] represents a very striking example of the function of the patent system in this country.

The plaintiff corporation, the Farr Corporation, when it was organized under an earlier name, had a capital of \$150. It started in business here in Los Angeles, first with the humidifier, manufactured the humidifier for a couple of years, and then brought out this filter, and this filter was brand new as far as the efficiency and the performance of the filter is concerned. It established a new standard in the industry. It had a performance that there had never been anything equal to it or approaching it.

The filter was commercialized, it was accepted throughout the industry. Each year the sales have grown. Since 1940 there have been \$7,500,000 worth of these filters sold by the plaintiff corporation, and it represents the founding of a new business based on the protection of a patent.

Like every other patent, I suppose the time comes when your competitors can't resist copying you and come in and contest your patent and try to take the business away from you.

But this is a case of a deliberate copying of an established brand new filter which was recognized in the industry as new and which had been a great success, and instead of continuing with their old device on which they had based the suit against these people, having lost that suit, they turn [19] over and copied the filter.

Now I have a specimen here of the Air-Maze accused filter medium. I will ask that it be marked Exhibit 6.

(The specimen referred to was marked Plaintiff's Exhibit No. 6 for identification.)

Mr. Leonard S. Lyon: You will see that it has sheets of wire mesh, crimped sheets of wire mesh, that those crimped sheets form multiple subdivisions in both dimensions, at right angles to the flow of the air through the filter, and you will see that it has the changes in directions formed by the angulation of the channels, and you will see that it does not have the flat strips and is therefore not as rigid a filter as the plaintiff's.

But we will show that this Air-Maze filter—by our evidence I expect to show—has the characteristic novelty and unique performance characteristics of the patented filter which we say no one had ever equalled in the prior art and, as far as I can see, Claims 4, 5, 7 and 8 of the patent read just as well on this medium as they do on the media used by the plaintiff.

The Court: Is it claimed to be a part of the patent that you use oil?

Mr. Leonard S. Lyon: The patent states that you dip these filters in oil.

The Court: I mean, is that part of the invention or [20] is that old?

Mr. Leonard S. Lyon: No, all these impingement filters had to be dipped in oil, and had been for some time.

Now there is one matter that we would seem to be in disagreement about. As I say, that catalog of the P-5 accused filter was served on us by the defendants in connection with this demand, and in the statement accompanying the catalog is this:

“Said catalog is filed herewith as Exhibit B to



the motion of the defendants to quash and modify subpoena and to limit the depositions under Rules 26, 30-B and 45-B in order to simplify the issues herein, save the time of court and counsel, and to facilitate preparation by plaintiff of the statement as provided under Item 6-A and 7-A referred to in said motion, as to which of said devices plaintiff claims infringed the patent in suit. Defendants also submit the within catalog in support of their motion for a more definite statement under Rule 12-E now pending herein and also to facilitate preparation by plaintiff of a more definite statement under Items 2 and 4 of the motion if said motion is granted.”

In the statements accompanying this catalog made at the hearing and in the briefs, counsel stated that this catalog [21] showed all of the devices, the only devices, that the defendant was manufacturing. I will refer to those statements in detail if the occasion becomes necessary.

Now on Monday of this week, although the case has been at issue in this court many times, we received a letter from Mr. Harris in which he, with three other specimens, wants to have those types adjudicated in this case.

\* \* \* \* \*

There is a fourth type referred to, and that is an abandoned type, that they had abandoned, and told us they abandoned and no longer carried in their catalog.

We certainly are not interested in litigating their abandoned types. So I think that may be something

that we should have definitely settled at the beginning of the trial. [22]

\* \* \* \* \*

The Court: Is there a cross-claim for declaratory relief here?

Mr. Harris: Yes, your honor, there is.

The Court: Does it include these specimens?

Mr. Harris: None of the pleadings say anything about the types of filters, accused or charged to infringe.

The Court: In your cross-claim do you—well, let us see it. (Examining document.)

Mr. Harris: It is simply a prayer for declaratory judgment at the end of the answer.

The Court: That is the first amended answer?

Mr. Harris: I think that would be the second one, your Honor. That is on top of the file.

The Court: You only filed one first amended answer? [23]

Mr. Harris: On September 17th, first amended answer; yes, your Honor.

The Court: You just include that in your prayer?

Mr. Harris: That is correct, your Honor.

The situation on that, if I may state, your Honor, is this: The plaintiff here, in answer to our inquiry, stated that they would rely upon the Type P-5 Air-Maze filter as an infringement of the patent in suit.

I find now last week, the end of last week, that the defendant Air-Maze Corporation has for many

years prior to the manufacture of the present P-5 filter charged to infringe, made an earlier type of P-5 filter, which was so known to the art and sold as such. Now I want to know which P-5 the plaintiffs here are going to charge as the infringement of the patent in suit.

I have one of the old obsolete P-5s here. I displayed one to counsel Monday, and I am sure the representatives of the plaintiff corporation are familiar with that filter for many years because the Air-Maze Corporation has sold 8000 or 10,000 of them in a period of four or five years.

So I want to know whether that is in suit or not, because it has been sold within six years of the filing of this suit. There might be a claim for damages against that obsolete type P-5.

The Court: Does it correspond with the P-5 described in [24] your catalog?

Mr. Harris: No, sir, it does not. It is a different construction.

The Court: It is a different P-5?

Mr. Harris: It is a different P-5; yes, sir.

The Court: What is your position on that?

Mr. Leonard S. Lyon: We are not charging it with infringement in this case. We have understood it is abandoned and we are not bringing it into the case at all.

Now, as I understand it, it hasn't been sold for many years and it has been abandoned and replaced by the device that we do accuse.

The Court: Which is the P-5 as illustrated in the catalog which does not appear to have any date? Does this catalog have any date?

Mr. Harris: I don't know, but the sales of those started about 1948.

The Court: It says P-5-1047, which is the only key or description that I can find on this.

Mr. Harris: The sales of those started about 1947 to '48, your Honor, I have been advised.

May I have this sample P-5, obsolete filter, marked for identification so that the record will show what we are talking about here?

The Court: Defendants' Exhibit A. [25]

\* \* \* \* \*

The Court: You do not mention any P-5 in your original complaint.

Mr. Leonard S. Lyon: We did in the motion to make more definite and certain, and we referred to the catalog, your Honor, which you have in front of you. [27]

\* \* \* \* \*

Mr. Harris: Your Honor, just so the record is clear, my understanding from this colloquy is that the plaintiff in this case does not contend that the P-5 obsolete, Defendants' Exhibit A for identification, is an infringement of the Farr patent in suit.

Mr. Leonard S. Lyon: I make no contention one way or the other about that. That is an abandoned device. It has long since disappeared. It hasn't been around for years and years [30] and is not being made now.

The Court: Maybe they will start making them again.

Mr. Leonard S. Lyon: If they do, then we will talk to them about it. But it is not in issue in this case. [31]

\* \* \* \* \*

The Court: It would seem to me that the plaintiffs should now make up their minds as to whether or not you are either going to claim damages for the past sales or waive it as to that particular device.

Mr. Leonard S. Lyon: We do do that.

The Court: And whether or not you are going to claim an injunction in the event the patent is held good as to that particular device.

Mr. Leonard S. Lyon: That I agree with your Honor on. We have no intention of pressing any claim for these abandoned sales, no intention of asking the court in this case to grant any injunction against this abandoned device. [32]

\* \* \* \* \*

Mr. Harris: Just for the purpose of the record, I would like to identify the contents of Exhibit B for identification:

Tab No. 1 is Patent No. 1,118,237, to St. Cyr.

Tab No. 2 is Patent No. 1,548,839, to Henshall.

Tab No. 3 is Patent No. 1,566,088, to Greene.

Tab No. 4 is Patent No. 1,576,121, to Preble.

Tab No. 5 is Patent No. 1,729,135, to Slauson.

Tab No. 6 is Patent No. 1,756,758, to Orem.

Tab No. 7 is Patent No. 1,841,250, to Merryweather.

Tab No. 8 is Patent No. 2,019,186, to Kaiser.

Tab No. 9 is Patent No. 2,079,297, to Manning.

Tab No. 10 is Patent No. 2,286,480, to Farr.

Tab No. 11 is Patent No. 2,252,242, to Wood.

All of those patents are United States letters patent.

Next, Tab No. 12 is British Patent No. 24,467, to Kirkham, issued in 1904.

Next, as Tab No. 13, is British Patent No. 13,222, to Row, also issued in 1904. [35]

Tab No. 14 is British Patent No. 211,756, to Moller, issued in 1923.

And Tab No. 15 is a French patent, No. 739,956, to Niestle, issued in 1932. [36]

\* \* \* \* \*

Los Angeles, California

November 29, 1951; 10:00 o'clock a.m.

The Court: All right, you may proceed.

Mr. Harris: If the Court please, as a footnote to yesterday's opening statements, I think, in fairness to the plaintiff and the plaintiff's counsel, we should state at this time that the defendants will rely upon a further defense, and that is this:

The patent in suit bears the application date of April 4, 1940. Actually, when this application was filed, on April 4, 1940, the application was not signed by the applicant, the specifications and claims were not signed by the applicant as required by statute, and it was not until February 6, 1942, that Morrill N. Farr filed with the Patent Office a signed specification and claims as required by statute, and we shall contend that, by that time, February 6,

1942, that was the effective date of the application, the filing date, and that by that time the construction illustrated and described in the patent in suit had been in public use for the two years.

The Court: Very well. I think that defense is set up in your answer, isn't it?

Mr. Harris: It is, your Honor.

Mr. Leonard S. Lyon: The application inadvertently was not signed and we take the position that was a mere formality which the Patent Office could be allowed to be [58] corrected and which they did allow to be corrected, and the application is effective as of the date of the original filing.

I have two formal matters before I start with the evidence, your Honor.

The plaintiff alleges that the plaintiff, Farr Company, is a corporation organized and existing under the laws of the State of California. The defendants deny that allegation for lack of information. I don't understand that that raises an issue, but to avoid any question I will ask if the defendants will concede that that allegation is correct and that the plaintiff is a corporation organized and existing under the laws of the State of California.

Mr. Harris: We make no issue on that, your Honor.

The Court: Well, do you stipulate?

Mr. Harris: Yes, we do so stipulate. [59]

Mr. Leonard S. Lyon: The defendant Air-Maze Corporation is a foreign corporation and has been served in this district and venue against that corporation is asserted by plaintiff in this case on the

basis that the defendant Air-Maze Corporation is doing business in this district.

At the time of the hearing on the motion to quash and the issue as to venue, the defendant stipulated before your Honor that it was doing business in the Southern District of California. In your Honor's opinion—I am reading from it on the venue question—you stated:

“The defendant Air-Maze Corporation is a Delaware corporation. It has filed a motion to dismiss and to quash service of summons for want of jurisdiction and improper venue. While there is some dispute as to the extent of the agency and activity of the defendant Gratiot, who held himself out as factory representative of the defendant corporation, it is conceded by the corporate defendant that his activities were more than that of a mere solicitor of sales and, in fact, that the corporation was doing business within this district in the jurisdictional sense.”

That concession appears on page 3, lines 9 to 22 of the memorandum of defendant Air-Maze Corporation in support of the motion to dismiss the action and to quash the return of [60] service of summons for improper venue.

Now my point is, in view of the statements that were made in the opening statement by counsel for the defendant yesterday and in view of the pleadings in this case in the answer which was served subsequent to this hearing on the motion to quash, does that stipulation stand or is it necessary that we go into the proofs that were taken on this matter and which are in the form of depositions?



In other words, the concession was made and recited in your Honor's opinion. I don't want any misunderstanding of failure of proof on this point, but I don't want to burden the court with a long consideration of depositions on a matter that is, in fact, conceded and stands conceded.

Mr. Harris: Your Honor please, I think my recollection is that Overton, Lyman & Plumb handled the representation for the defendant on that motion to quash and dismiss for Air-Maze Corporation.

I do not know what understandings were had at that time. Any stipulations which were made of course we will abide by, but I might say this at this time, that we are not going to waive our defense that was raised by that motion that this court does not have jurisdiction and that the venue is improper.

The Court: As I understood the question at the time I decided it previously, it was conceded that Air-Maze was [61] doing business in this district and the question narrowed down to the proposition as to whether or not the provision in Section 1400(b) of Title 28, having in the conjunctive the requirement that it must commit acts of infringement and have a regular and established place of business. It was not conceded that they had a regular and established place of business in this district, but it was conceded that they were doing business.

So the point is still preserved that you raised then, unless you wish to put proof on to bring them within the conjunctive provisions of that section. But that is up to the plaintiff.

Mr. Leonard S. Lyon: I am not interested at this time in any point except whether or not it stands conceded.

The Court: That they were doing business?

Mr. Leonard S. Lyon: That they were doing business in this district.

The Court: Well, the concession was made then. I suppose they are standing by the concession and the stipulation made at that time.

Mr. Harris: I have just stated that. Anything that was conceded then we concede now. Whether it was conceded then, I do not know.

The Court: It was conceded. Now you know.

Is it your intention, Mr. Lyon, to put any evidence on [62] under that provision of the code which states that there is jurisdiction where it has committed acts of infringement and has a regular and established place of business?

Mr. Leonard S. Lyon: No.

The Court: You do not propose to offer any proof that they have a regular and established place of business?

Mr. Leonard S. Lyon: We are going to stand on the proposition that that is sufficient to establish venue.

The Court: And that they have committed acts of infringement, however, in this district?

Mr. Leonard S. Lyon: Yes, they have, but in the sense that through Mr. Gratiot the accused filter panels have been sold in this district.

The Court: Very well.

Mr. Leonard S. Lyon: At this time, your Honor,

we will offer in evidence the patent in suit which has heretofore been marked Exhibit 1 and ask that it be received as Exhibit 1.

The Court: It is in evidence.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1.)

[Printer's Note: Plaintiff's Exhibit 1 is reproduced in Book of Exhibits.]

Mr. Leonard S. Lyon: At this time I am offering in evidence the certified copy of the file wrapper and contents of the patent in suit, which has heretofore been marked Exhibit B on defendants' motion for summary judgment, and ask that [63] it be received in evidence as Plaintiff's Exhibit 7.

Mr. Harris: No objection.

The Court: I think it would be preferable to make it Exhibit 1-A, the patent and the file wrapper.

Mr. Leonard S. Lyon: All right.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1-A.)

[Printer's Note: Plaintiff's Exhibit 1A is reproduced in Book of Exhibits.]

Mr. Leonard S. Lyon: As has been explained to your Honor, the application which is incorporated in Exhibit 1-A, which was just offered in evidence, was filed as a substitute for an earlier application, the earlier application then having been dropped.

At this time I offer in evidence a certified copy

of the file wrapper and contents in the matter of the earlier application, Serial No. 285,904. —

This certified copy has been before the court and heretofore marked Exhibit B to defendants' motion for summary judgment. I will ask that it be received in evidence and marked——

The Court: Plaintiff's Exhibit 1-B.

Mr. Harris: No objection.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1-B.) [64]

[Printer's Note: Plaintiff's Exhibit 1B is reproduced in Book of Exhibits.

### SYDNEY F. DUNCAN

called as a witness on behalf of the plaintiff, being first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Sydney F. Duncan.

\* \* \* \* \*

### Direct Examination

By Mr. Leonard S. Lyon:

Q. You have stated your name. Will you please state your residence?

A. 3872 Welland Avenue, Los Angeles 8.

Q. How old are you?            A. 47.

Q. What is your occupation?

(Testimony of Sydney F. Duncan.)

A. I am professor of mechanical engineering and head of the mechanical engineering department of the University of [65] Southern California.

Q. How long have you been on the faculty with the University of Southern California?

A. I have been on the faculty there 22 years.

Q. What school training in engineering did you have before you went with the faculty of the University of Southern California?

A. I graduated from California Institute of Technology in 1924, with a Bachelor Science in mechanical engineering, and in 1925 with a Bachelor of Science in electrical engineering, and again in 1939 with a Master of Science in mechanical engineering, all from California Institute of Technology.

Q. Now, what if any experience have you had with dust filters?

A. Well, the experience with dust filters as such might be divided into two categories: (1) studies that I have pursued in the field of the mechanics of flow of gases and so on which are involved, and (2) through the observation and study of the action of dust filters of various kinds in the ordinary pursuit of my mechanical engineering activities.

Q. Have you had any employment by the plaintiff, Farr Company?

A. I have been acting as consultant to the Farr Corporation for some years, and at the present time I have a one-year's leave of absence from the university to work with them on problems of research and development.

(Testimony of Sydney F. Duncan.)

Q. How long have you acted as consultant for the Farr Company?

A. I do not remember exactly, but I have been associated with them in one way or another, either as a friend or as a consultant, ever since they started the business.

Q. Will you explain what you mean by acting as a consultant for them? What have you done as a consultant for the Farr Company?

A. Well, in working with the Farr Company, my principal activity as a consultant has been to assist in designing and discussing the operation, the operative characteristics of, and building and checking filter test apparatus.

I have also discussed with them and assisted in the design of machines for producing filters, and we have also consulted together on various possible arrangements of our filter media to achieve certain desired results.

Q. Did you testify as an expert witness for the Farr Company before Judge Yankwich in the suit involving Greene Patent No. 1,566,088, entitled "Air-Maze Corporation et al. v. Temperatair and Farr Company, Defendants," Civil Action No. 2519-Y?      A. Yes. [67]

Q. In Plaintiff's Exhibit 1-A, on page 47, is a document entitled "Affidavit of Sydney F. Duncan." Are you the Sydney F. Duncan who made that affidavit?      A. Yes.

Q. Have you reviewed this affidavit recently?

(Testimony of Sydney F. Duncan.)

A. Yes, sir, I have.

Q. Are each of the statements contained therein true and correct according to your present knowledge?

Mr. Harris: That is objected to, if the Court please. It calls for a conclusion of the witness and he should state the facts and not his conclusions as to these statements.

Mr. Leonard S. Lyon: I am trying to save time, your Honor. Here is an affidavit filed by the witness in the Patent Office, and I can read it to him and ask him to state if it is a correct statement.

Mr. Harris: The affidavit is some twenty-odd pages long, as I recollect.

The Court: What page?

Mr. Leonard S. Lyon: Page 47.

The Court: Well, it is a little unorthodox way to make proof. You object to it?

Mr. Harris: Yes.

The Court: You can't cross-examine the affidavit, but the witness is here and you can cross-examine him.

Mr. Harris: That is right, your Honor. [68]

The only point is that by testimony he cannot vary the terms of the affidavit. At the same time we have to take the affidavit and go through it, bit by bit, and pick out every point that we might think might be material to the issues in this case, which I think puts a hardship on the defendants. Certainly all the facts stated in this affidavit are not material to this case.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Well, I think they are. This was an affidavit presented in the Patent Office by the witness.

The Court: Well, this appears to be largely expert opinion.

Mr. Leonard S. Lyon: That is right, your Honor. I am going through the pertinent material with the exhibits, your Honor, but I thought that counsel would appreciate my laying the witness open to cross examination. They have criticized some of the proceedings in the Patent Office, and I have the witness here and they can cross-examine him on any of them in this affidavit.

Mr. Harris: We think many of the statements are objectionable, if the Court please, are conclusions of the witness and are subject to objection.

The Court: Well, for instance?

Mr. Harris: Here is one right at the front somewhere that is an all-sweeping conclusion, if I can find it quickly.

The Court: Well, he is qualified as an expert. He can [69] give his opinion.

Mr. Harris: Here it is, on page 47 of the file wrapper, where he says:

“The air filter panel in the above-entitled application possesses an entirely new and original mode of operation in removing dust from air.”

I think that is a very sweeping conclusion, for which there has been no foundation laid to date in the testimony in the case or according to the affidavit either.



(Testimony of Sydney F. Duncan.)

The Court: Yes, that is quite a sweeping conclusion but I suppose he would be entitled to express his opinion. That, however, is the thing which the court must decide. I think, with that exception, probably the rest of it—I haven't read it through, but it appears to be an exposition of the processes of air filtering involved.

Mr. Harris: Well, I think that we could pick out other statements.

The Court: What is that?

Mr. Harris: It seems to me, your Honor, that is a curious way to make evidence in a case, to take an affidavit a man has made and ask him if all the statements therein are true and correct.

The Court: Yes, it is a little unorthodox, I would say, but as long as it is an opinion—You are entitled to press your objection, I think. I don't see anything wrong with the [70] question. You can cross-examine him on it. With that one exception there, I will sustain your objection, insofar as that conclusion is concerned, that "The air filter panel in the above-entitled application possesses an entirely new and original mode of operation in removing dust from air."

Mr. Harris: I think, if the Court please, that there are other statements of similar import in the affidavit. I can't put my finger on them at this moment, but, on behalf of the defendants, we make similar objection to such other statements as are in there.

The Court: Yes.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: At page 81 of Exhibit 1-A, under the title "Remarks," the following appears:

"The interview courteously accorded a representative of applicant's counsel and the affiants in this application by the Primary and Assistant Examiners is hereby acknowledged with appreciation. At this interview favorable consideration of claims of the character now presented was indicated."

Your Honor, this was the interview that was referred to in Mr. Baldwin's opening statement yesterday. [71]

By Mr. Leonard S. Lyon:

Q. Did you attend that interview?                      A. Yes.

Mr. Leonard S. Lyon: My brother reminds me that the witness has not yet stated his answer to my preceding question.

The Court: That is correct.

Mr. Leonard S. Lyon: I would like an answer to that.

The Court: Whether or not the statements contained in this affidavit are true.

The Witness: Yes, they are.

By Mr. Leonard S. Lyon:

Q. Where did this interview take place that I have just referred to?

A. It was in the Patent Office in Washington.

Q. Who was present at that interview?

A. Richard S. Farr and myself and I think a representative from a law firm, Bacon & Thomas, I believe, in Washington, and the patent examiner.

(Testimony of Sydney F. Duncan.)

Q. Now as indicated by the date on this document to which I have just referred, this interview occurred on or about October 28 or 29, 1941. Is that according to your recollection?

A. I don't remember exactly, but it is about then. [72]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Are you familiar with the patent in suit?

A. Yes, I am.

Q. Are you familiar with the filter panels that have been manufactured and sold by the plaintiff Farr Company under that patent in suit?

A. Yes, I am.

Q. Have you had occasion to consult with reference to the technical aspects of those filters and their performance and are you wholly familiar with their design, their method [74] of operation and their performance characteristics?

A. Yes, I am.

Q. Have you had occasion to establish test apparatus and testing techniques for use with those filters?

A. As I have said before, I have consulted with Farr Company for a good many years on establishing of testing techniques and the design of test apparatus.

Q. I call your attention to Exhibit P-2 for identification. Can you recognize this——

The Court: P-2?

Mr. Leonard S. Lyon: Plaintiff's Exhibit 2.

(Testimony of Sydney F. Duncan.)

Q. Can you recognize this as a typical commercial size filter panel of the type manufactured and sold by the plaintiff?      A. Yes, I can.

Q. Farr Corporation under the patent in suit?

A. Yes, very easily.

Mr. Leonard S. Lyon: I ask that the specimen that the witness has just identified be received in evidence as Plaintiff's Exhibit No. 2, a specimen of the commercial Farr filter panel as manufactured and sold under the patent in suit by the plaintiff corporation.

Mr. Harris: No objection.

The Court: Admitted. [75]

(The specimen referred to was received in evidence and marked Plaintiff's Exhibit No. 2.)

By Mr. Leonard S. Lyon:

Q. I show you Plaintiff's Exhibit 3 for identification. Do you recognize this as a true specimen of the filter material utilized by the plaintiff corporation in filters of the type represented by Exhibit 2?

A. Yes, it is a very good example of that type of medium.

Mr. Leonard S. Lyon: The exhibit just identified by the witness is offered in evidence as Plaintiff's Exhibit No. 3.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 3.)

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. I hand you a trade bulletin of the Farr Company entitled "Far-Air Filters," and ask you if you can tell us what that is.

A. This bulletin entitled "Far-Air Filters" is our newest bulletin describing the air filters made by Farr Company.

Q. Of the type illustrated by Exhibit 2?

A. Yes, of the type illustrated by Exhibit 2.

Q. Did you edit this bulletin before it was printed?      A. Yes, I did. [76]

Q. And approved each of the statements therein?

A. Yes, I went over the whole bulletin before it finally went to press.

Mr. Leonard S. Lyon: I will offer the bulletin in evidence.

The Court: What is the next number, 7?

The Clerk: 7.

Mr. Leonard S. Lyon: As Plaintiff's Exhibit 7, your Honor.

The Court: In evidence.

(The bulletin referred to was received in evidence and marked Plaintiff's Exhibit No. 7.)

By Mr. Leonard S. Lyon:

Q. Now will you take——

The Court: When was this published?

The Witness: I think we just got it last week.

By Mr. Leonard S. Lyon:

Q. It is a successor to a previous one?

(Testimony of Sydney F. Duncan.)

A. A successor or rewrite and improvement over a previous bulletin of somewhat similar nature.

Q. Will you now take a copy of the patent in suit and using that and with reference to Exhibits 2 and 3 explain to the court first the construction of the air filter described in that patent?

A. May I have Exhibit 3, please? [77]

(The exhibit referred to was passed to the witness.)

The Witness: Because I don't have a marked copy of the patent up here, I may have to look a moment for certain lines. But the patent specifications and the drawings describe a filtering panel made of sheets of crimped wire screen where the sheets are placed parallel to the direction of flow of the air to be filtered.

Now referring to Exhibit 3, a sheet of crimped wire screen would be this top layer which I have bent out.

The sheet of screen itself from which the crimped sheet was made takes a number of different directions in this crimped sheet, but the general plane of the crimped sheet lies parallel to the direction of flow of the air or gas or what ever medium is being passed through this filter.

In the manufacture of this filter and its assembly in the frame, which is shown more clearly surrounding the media on Plaintiff's Exhibit 2, this crimped screen is packed next to a layer of flat screen.

(Testimony of Sydney F. Duncan.)

This is a manufacturing convenience and enables the Farr Company to make these filters somewhat more rapidly and economically than the omission of the flat screen.

The patent specifications show in Fig. 2 a drawing of a construction which might be observed on Plaintiff's Exhibit 2 up in one of the corners where parts 3 are the frame, 5 is the aperture made by the crimps in the screen and 4 I believe [78] refers to the crimped screen wire itself.

The Court: 4?

The Witness: 4.

And 9 refers to the flat wire.

There are certain manufacturing advantages, as I have said, in using the flat wire and the crimped wire together, one of which is to make the filter panel somewhat more rugged and give it a little more area on which dust must collect.

The strips are run into a machine where they are crimped, they are fed in then by automatic apparatus into the frame which is a channel-like structure bent up in three sides of a rectangle usually, and as soon as the frame is packed full the fourth side of the rectangular channel section is closed with a suitable other sectional channel to strengthen the frame and hold the two open ends of the previously bent channel together, to keep the medium intact.

At this point the filter is placed in another machine and a rod drilled through it from top to bottom in a direction perpendicular to the general direc-

(Testimony of Sydney F. Duncan.)

tion of the sheets of crimped screen, the function of this rod being to further stiffen the filter media.

After assembly the filter is dipped in oil and the excess is either drained off or otherwise removed, the filter is wrapped in suitable paper and is ready for shipment to a user in its oiled condition, and then it is ready to be installed [79] in a bank of filters for taking the dust out of air.

Q. (By Mr. Leonard S. Lyon): Referring to Exhibit 7, is that——

The Court: Before you get to that, is there any significance in the depth of the crimps or height, or whatever you call them?

The Witness: In this particular sample of media, the crimps are made deep enough so that the filter has four layers to the inch very closely.

We also make them with—we can make them with three layers to the inch or with six layers to the inch or with varying numbers of layers to the inch.

The thing that determines the number of layers to the inch is the application of the filter. For instance, if the filter is being applied in a duct where there is a large amount of pressure available, then we could use more layers to the inch and decrease the height of the crimp, which would also decrease the width of the crimp.

The Court: And would give you more screen surface?

The Witness: And would give you more screen surface, and it would cause a higher pressure drop in the system.



(Testimony of Sydney F. Duncan.)

For a ventilating system such as supplies air to this room, it is desirable to have a fairly low pressure drop and so we have found that more layers to the inch give us a good average performance for many applications, although we do [80] make them with other numbers.

The Court: What do you mean, low pressure drop? You mean the pressure drops when the thing gets dirty?

The Witness: No—well, that is true, your Honor, but when we speak of pressure drop, this filter is installed in some kind of a system where air is delivered to one side of the filter and flows out the other side.

Because of the fact that the filter offers some resistance to that flow of air, there is a drop or decrease in pressure across the filter, whether it be clean or dirty. Anything that we interpose in such an air stream would cause a slight drop in pressure.

This drop in pressure is usually measured in inches of water by means of a U-tube filled with water, the low pressure being connected to one side of the U and the higher pressure to the other side of the U, and then the water will not stand at the same level in both sides of the U-tube, and we measure that difference in level and call it inches of water drop, sometimes referred to as inches of water.

By Mr. Leonard S. Lyon:

Q. What is the significance of that pressure drop? What does it present as a problem? Should

(Testimony of Sydney F. Duncan.)

it be avoided or what does it mean to a man interested in filtering air through these filters?

A. Well, to the man who is operating the ventilating [81] system, the pressure drop means that he has to supply electrical or mechanical energy to drive the air through, and the higher the pressure drop the more work it takes to maintain the flow through the filter.

Q. Is that a controlling factor in the use and sale of filters of this kind, what the pressure drop is?

A. It is a factor which is always taken into consideration.

Q. And in that sense it is an important factor?

A. It is an important factor; yes.

The Court: Do the greater number of layers per inch perform the function of cleaning the air more?

The Witness: Yes, it gives a somewhat higher filtering efficiency.

The Court: But requires a greater application of force to the air to get through?

The Witness: Also a somewhat higher pressure drop. [82]

By Mr. Leonard S. Lyon:

Q. What do you mean by filtering efficiency?

A. Well, the efficiency of a filter—

The Court: It makes the air cleaner, isn't that what you mean?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. How do you measure it? How is it determined or expressed?

(Testimony of Sydney F. Duncan.)

A. We express the efficiency of a filter in per cent, and the per cent figure is arrived at in a test set.

The test set is essentially a duct with a dust-feeding apparatus at one end and an air-measuring device someplace toward the latter part of the duct, and a fan or blower to draw air through the duct.

In the duct that has been developed at the Farr Company, we sample the dust content of the air ahead of the test filter. Our duct, incidentally, is built to take a full commercial size filter, of this size, 20 by 20 inches.

We sample the dust concentration in the air approaching the filter and we sample the dust concentration in the air after the filter.

The difference in dust concentration has been removed by the filter, and the amount of dust removed by the filter, divided by the amount of dirt in the entering air, is [83] considered to be the efficiency.

Q. Now, is the efficiency over-all the only factor that governs the adaptability or value of these filters, or is it only one factor?

A. It is only one factor in the things to be considered in choosing a particular filter for a given application.

Q. How do you correlate, in choosing a filter, the efficiency of the filter as compared to the pressure drop?

A. Well, that depends on the application, principally. There are certain fundamental principles that we might state about the application of a filter.

(Testimony of Sydney F. Duncan.)

Since we know that the pressure drop causes us to do work to maintain the air flow through the filter, a low-pressure drop is usually considered desirable.

Since we have a device which is supposed to remove dust from the air, a high dust-removing efficiency is also desirable.

Since the filter will be operating over probably a considerable period of time, with perhaps frequent attention or infrequent attention, it is further desirable that the efficiency and pressure-drop characteristics of the filter remain reasonably constant with the passage of time.

So that we can probably best show the characteristics of filter operation by plotting a curve or showing, as it is [84] usually done, the efficiency of the filter versus the amount of dust that is held on the filter, and the pressure drop through the filter versus that same amount of dust held on the filter.

There are reproductions of such curves in the bulletin exhibit.

The Court: No. 7.

The Witness: No. 7, is it not?

Mr. Leonard S. Lyon: I have another copy here for you.

Q. I wish you would point to those curves in Exhibit 7 and explain to the court what they are, how they are made and what they show.

A. There seem to be no page numbers in this bulletin, through some strange oversight, but there is a page with a black tab at the left edge marked "Capacity Estimating Chart" and it is on this

(Testimony of Sydney F. Duncan.)

page that there appear reproductions of three characteristic curves.

One of these curves is labeled "Filter Performance With Composite Dusts." The vertical dimension of that curve has two scales.

At the top is an efficiency scale, starting at 100 at the top of the curve sheet and running down to 70 per cent just about the break in the curve sheet.

At the bottom is a scale of pressure loss and followed by the letters  $H_2O$ , indicating that that is the pressure loss [85] in inches of water, as I previously described.

Q. Is that pressure loss what is called the——

A. Pressure loss or pressure drop. The efficiency curve, then, for this filter starts at about 78 per cent and decreases slightly to about  $72\frac{1}{2}$  per cent when the filter has collected 800 grams of dust.

During the same test run, the pressure drop across this particular filter started at a little over one-tenth of an inch of water and rose to approximately one-eighth of an inch of water at the time that it held 800 grams of dust.

Q. Now, was the filter on which these measurements were made, recorded in this curve that you have just referred to, the same as Exhibit No. 2?

A. The filter tested is labeled "Far-Air 2 Type 44 Filter," and it is our usual production-run of filter. A sample was taken off the line and tested and gave these results.

When we used a particular dust mixture, incidentally, in the middle of this curve sheet there is

(Testimony of Sydney F. Duncan.)

printed the particular size, how much of the dust was used, and the chemical analysis of the dust used.

Q. And the filter on which these measurements were made and recorded on these curves was the filter made by the plaintiff corporation under the patent in suit, is that correct? [86]      A. Yes.

\* \* \* \* \*

Q. What do you know about the particular data recorded in this book?

A. The curves I have been just describing were run at my direction.

Q. And you examined the data?

A. Yes, I examined the procedure, the data, the results, and the final product, the curve sheet. [87]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. I note, Mr. Duncan, that the data and curves to which you are calling attention in Exhibit 7 are on a very small scale and I feel that it is putting something of a problem on the court to follow that small scale, so I have a remedy for that.

I hand you a booklet entitled "Technical Report on Improved Testing Methods for Air Filters," and ask you if you can tell us what that is.

A. This is a report that was prepared——

The Court: No. 8.

(The document referred to was marked Plaintiff's Exhibit No. 8 for identification.)

(Testimony of Sydney F. Duncan.)

The Court: Proceed.

The Witness: —by myself and others describing the test procedure and the test apparatus that is used at Farr Company.

By Mr. Leonard S. Lyon:

Q. And to which you have been referring?

A. It is on this apparatus and according to this procedure that the curves that I have been discussing on this page of the bulletin, Exhibit 7—the work was done on this apparatus and according to this procedure.

Q. And the same curves that you were referring to on Exhibit 7 appear in Exhibit 8, do they not? [88]

A. May I have a copy, please?

(The document referred to was passed to the witness.)

The Court: “Airflow, 519 FPM,” what does that mean?

The Witness: Feet per minute, lineal velocity, so that the lineal velocity applied by the net area of the filter would give the 1200 CFM, which is cubic feet per minute.

The curve I have described in the little bulletin is shown as graph 1 in the technical report, Exhibit 8.

The Court: “AC Spark Plug Standardized Fine Air Cleaner Test Dust,” what does that mean?

The Witness: That is a material that was developed during the last war to test air filters, and

(Testimony of Sydney F. Duncan.)

it is a natural earth material that is obtained in Arizona. It is screened and partially prepared there by the General Motors laboratory and then sent to the AC Spark Plug Division of the General Motors for subsequent classification and standardization so that it has a guaranteed particle size analysis, as shown on Graph No. 1 of Exhibit 8 under the heading "By Weight Dust Specifications" and the chemical analysis under the table on the same page "Dust Analysis, Chemical, Per Cent."

This dust is readily available and gives a uniform material to be used as a test dust.

It also contains a considerable percentage of fine material so that we get an overall picture of the performance characteristics and dust holding capacity of the filter by [89] using this.

The Court: These are the size of the microns and the percentage, I take it, from zero to five microns in size?

The Witness: Zero to five microns is the size of the dust particle that constitutes 39 per cent of this material by weight.

A micron is approximately 1/25,000 of an inch.

The Court: And 39 plus or minus 2 per cent, is that it?

The Witness: Yes.

The Court: That is to say, it might run down to 37 or it might run up to 41?

The Witness: Yes.

The Court: The dust analysis, chemical, these are the designated chemicals?



(Testimony of Sydney F. Duncan.)

The Witness: Yes.

The Court: Ignition loss, what is that?

The Witness: Ignition loss is that part of the material which is lost when it is heated and would represent perhaps carbonization material or perhaps a very small percentage of moisture.

The Court: Is the air heated for the test?

The Witness: No, the air is not heated for the test.

The Court: But it is heated by being forced at the speed?

The Witness: Not appreciably under the test conditions [90] of these filters.

By Mr. Leonard S. Lyon:

Q. By way of explanation, this dust analysis and chemical analysis for the test is an analysis that is made in the laboratory of the dust before the dust is brought to the test to be added to the air, isn't that correct?

A. Yes, this is the analysis that is guaranteed by the AC Spark Plug Division of General Motors Company and is made by them, not by us.

The Court: In other words, you take the dust and then you add it to the air, is that it?

The Witness: That is right.

By Mr. Leonard S. Lyon:

Q. For the purpose of making the test?

A. That is correct. But the air is not heated. The ignition loss is just a standard procedure in making chemical analyses.

The Court: What is "20 grams Fed."?

(Testimony of Sydney F. Duncan.)

The Witness: There should be no period after that. 20 grams of dust are fed into this test per hour with the airflow of 1200 cubic feet per minute passing through a filter of the size of Plaintiff's Exhibit 2.

The Court: That is not very much dust, is it? That would be 60 times 1200, or 7200 cubic feet, and 20 grams of dust. [91]

The Witness: Compared to the dust content of ordinary outdoor air, it is quite a lot.

The Court: I see.

The Witness: This is really an accelerated test.

The Court: What is the ordinary content of dust?

The Witness: The content of dust outdoors in the aid varies considerably, and it might be——

The Court: Well, on a clear day, not when a Santa Ana is blowing.

The Witness: About four or five grains per thousand cubic feet.

The Court: Is that what this means?

The Witness: No, that is grams, and I have to translate grains into grams to make the comparison.

There are 7000 grains in a pound—well, the exact ratio escapes me at the moment, but it is on the order of 10 or 20 times as much dust.

The Court: I have a table of weights and measures here.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Now will you refer to the next curve in Exhibit 7, which also is reproduced in Exhibit 8, the curve being entitled, "Filter Performance With 20-40 Micron Dust." Tell us what that test was and what the date showed.

A. This curve is shown as Graph No. 3 in Exhibit 8, and is made with dust that is obtained from the AC Spark Plug [92] standardized air cleaner fine test dust by a further classification of that dust.

There are devices available to separate out of the so-called composite dust which was used in the test represented on Graph 1, to separate out of that composite dust a narrow band of particle sizes.

In the test run from which the lines of Graph 3 were obtained, the larger particles out of the composite dust were segregated and used as the test dust. 20 to 40 microns is not the largest, but you see it comprises approximately 18 per cent of the composite dust.

The test using the same filter in the same test set at the same velocity, same number of cubic feet per minute, and again feeding 20 grams of test dust per hour was retested. The result is that on the coarser dust particles this particular filter shows a very high efficiency, better than 98 per cent on the average; whereas on the composite dust the filter showed an efficiency which, as I said

(Testimony of Sydney F. Duncan.)

before, started at about 78 per cent and went down to about 72½ per cent or thereabouts.

The Court: What is this "one pound" down here?

The Witness: That is simply to mark the point on the grams scale of where one pound shows up.

The Court: That is where one pound of dust has been fed into the filter? [93]

The Witness: No, sir.

The Court: Or was in the filter?

The Witness: One pound of dust has been caught by the filter.

The Court: One pound of dust had been caught by the filter?

The Witness: Yes.

The Court: Going back to this comparison of 20 grams fed per hour—you say that is several times the dust content?

The Witness: That is many times the dust content of ordinary air.

The Court: Many times?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Referring now to these curves that you have explained to the court, have you made similar tests on other types of filters other than the filter of the patent in suit? A. Yes, I have.

Q. Referring now to the same curves, you have called attention to the fact that the patented filter as shown by these curves has a high filtering efficiency and a low pressure drop and that both the filtering efficiency and the pressure drop remain

(Testimony of Sydney F. Duncan.)

constant for a long period of operation of the filter. [94]

Did you find that to be true of any other filter that you have tested?

A. It is true of a model or an example of the Air-Maze P-5 filter.

Q. Any other filter?

A. Not of filters of other designs that I have tested, unless they are filters built out of Farr media, either modified in dimension or thickness.

Q. In other words, it is your statement that the results you have referred to are unique to the structure of the patent in suit? Do you mean to say that?

Mr. Harris: That is objected to, if the Court please, as leading and suggestive, calling for a conclusion.

Mr. Leonard S. Lyon: I think he has already said it, but I wanted to make it clear. They can cross examine him all they want to. This is an expert witness.

The Court: Yes, it is leading and suggestive, but I will permit the question. Objection overruled.

The Witness: Yes, these results are unique to this type of construction.

By Mr. Leonard S. Lyon:

Q. Now looking at the inside back cover page of Exhibit 7, at the top of the page are some photographs with the legend, "The photographs above illustrate in part the wide variety and types of applications where Far-Air filters can be [95]

(Testimony of Sydney F. Duncan.)

utilized." Can you explain to the Court these different applications? I think it may help the Court in understanding how these filters are used.

The Witness: Most of these photographs referred to show installations where a number of filter panels are assembled in a holding frame and are used to take the dirt out of air entering some kind of a ventilating system.

In only one picture do I see an installation that is of a slightly different type of application, and that is in the lower picture at the extreme right. I believe, since a close examination shows that there is a cook in the picture, that these are filters to——

The Court: Where?

The Witness: This page, the inside back page.

The Court: I was looking at the wrong place.

The Witness: These are Farr filters used to collect grease droplets out of the air in a kitchen and prevent them from being deposited in the ducts and so constituting fire hazard.

By Mr. Leonard S. Lyon:

Q. That is true only of the photograph in the lower right-hand corner?      A. Yes.

The others are usual types of installations where a number of the filters are placed in holding frames and used to [96] handle large or small quantities of air.

These filters I believe are practically all 20 by 20s, that is, this commercial size of Exhibit 2, and if one makes an estimate of the number of panels and multiplies by 1200 CFM one may get an idea of the total airflow in any one of these cases.

(Testimony of Sydney F. Duncan.)

Q. Now will you go back to your description of construction of a patented Farr filter as set forth in the patent in suit and by reference to Exhibits 2 and 3. You were interrupted after you had explained to the Court the use of the crimped sheets of wire mesh arranged parallel to the flow of the air.

Now will you take up your description from there on?

A. The construction, as possibly shown a little better in Exhibit 3, shows the sheet of crimped screen—it could be called corrugated, I suppose, also but we usually refer to it as crimped screen—shows the crimped screen with changes in the direction of the crimp. This change in the direction of the crimp is referred to by us as a herringbone crimp and the herringbone pattern is produced by the rather abrupt change in direction of the crimp itself.

The function of the crimps is to provide passages through the filter. The function of the change in direction of the crimp is to provide a change in direction of this passage.

A further function of the crimps, of the sheet of crimped [97] screen, are to divide the panel up in both dimensions of its face so as to divide the airstream into many small filaments.

The flat screens, of course, do not contribute to the division of the panel in any but one direction. The crimps of the sheet of crimped screen contribute to the multiple subdivisions of the panel in both dimensions of its face.

(Testimony of Sydney F. Duncan.)

When air has passed through this filter, it flows in general parallel to the direction of the sheets of screen.

Stated another way, the sheets of screen are positioned on purpose so that the sheets are parallel to the intended direction of flow of the air or dust-laden gas, or whatever is being used .

The airflow then is quite obviously largely along the surface of the flat sheet of screen, but the airflow is not necessarily entirely along the surface of the screen which was crimped.

The airflow end approaching one of the passages formed by the crimp will flow partially down the passage and partially through the meshes of the screen walls of that passage.

This combined action of flow through the passage or along the passage and through the meshes of the screen produce a high degree of turbulence and mixing.

This turbulence or mixing action, combined with the fact that the passages are of not too great cross-section, places each dust particle as it enters the filter in rather close [98] juxtaposition with some dust collecting surface. The surface on which the dust is collected in this filter is the actual surface of the wire.

As I have said before, this filter before being used is dipped in oil. Other materials could be used, but oil is a handy and very effective adhesive and the individual wires of the screen are coated with oil. [99]



(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Now, I hand you a series of photographs. There are eight pages of them.

Mr. Leonard S. Lyon: Will you mark these temporarily for identification as Exhibits 9-A——

The Court: 9-A, et cetera.

Mr. Leonard S. Lyon: The top one will be 9-A, through the alphabet to 9-H.

(The photographs referred to were marked Plaintiff's Exhibits 9-A through 9-H, for identification.) [100]

\* \* \* \* \*

Q. Now, will you refer to these photographs, Exhibits 9-A to 9-J, and state first whether you had these photographs made? [101]

A. I had all of these pictures taken and supervised their composition and the work that was done to produce this series of photographs.

Q. What are they for, to show what?

A. The purpose of this series of photographs is to show how the dirt collects on the individual wires of a Farr filter of the type shown in Plaintiff's Exhibit No. 2.

Q. Now, will you take up each one of these photographs in order and tell us what that particular photograph shows, and any comment you wish to make on it?

A. I refer, first, to photograph 9-H.

The Court: That is the little one?

The Witness: No. It is this one (indicating photograph), Your Honor.

(Testimony of Sydney F. Duncan.)

The Court: Oh, yes, 9-H. All right.

The Witness: This shows the test filter that was used to make these tests. The filter in this particular picture was taken apart, in two pieces, and the lower piece, or larger piece, is a picture of the front of the filter and at the end of the whole test series of the little piece sitting on top, which is just about full scale, full size, and labeled "Back," which is the back of the filter at the end of the test. The picture was taken just to——

The Court: It is not the back of the lower portion?

The Witness: It is not the back of the lower portion. [102]

The Court: No.

The Witness: But it is the back of the rest of the filter.

The Court: All right.

The Witness: (Continuing) This filter during test was assembled so that the flat screen and crimped screen were in contact, and the view of those two layers of screen as they were clean is shown in the photograph labeled 9-A, entitled on its face, "Clean Oiled Filter."

This small test filter was then installed in a small test duct which is built for seven- by seven-inch filters of the size shown approximately by an identified exhibit of defendants, A, I think. It is about that size.

And the same test dust as was described as being used in the tests of the large panel filter is fed

(Testimony of Sydney F. Duncan.)

into the air stream in a fairly heavy concentration, somewhat heavier than is used in the life test of the filter. 10 grams of this dust was fed into the air stream and that was called a load.

The test run was shut down and the filter was removed and very carefully separated at this pre-arranged plane and examined. I personally examined it each time—

The Court: In the photograph?

The Witness: And after 10 grams and 20 grams had been thrown at the filter, I felt that there was nothing we could see in a picture of this size, and so it wasn't until after [103] 30 grams had been loaded on the filter that we took the first picture, labeled "Exhibit 9-B," and titled on its front, "After 3 Loading Runs."

Examination of this picture shows that toward the lower part of the lower section of the separated filter there is a slight deposit of dust.

The Court: Is that the front or the back?

The Witness: That is the front of this filter.

The Court: Where the air was introduced?

The Witness: The air flow in each of these pictures is up, on both halves.

Now, there are a few places in photograph 9-B where a considerable dropping of oil is visible. These spots appear above the change in direction of the crimp, in each case, and should not be confused with the dust which is deposited toward the front or lower side of the filter in this picture.

After 40 grams of dust had been fed into the

(Testimony of Sydney F. Duncan.)

air stream, the filter was again separated and the picture 9-C was taken. In this picture it is quite obvious that dust has collected. I can point to it.

Mr. Leonard S. Lyon: Yes, I wish you would, to be sure.

The Court: It looks like the solid portion along the border.

The Witness: The solid portions along the lower half of the lower part of the filter are dust. That is slightly [104] bright and shiny looking. Up in the front part are still a few places where there is quite an oil supply.

It will be noticed that the dust has collected on a portion of the crimp that would be represented by the upstream side of the angled section near the face of the filter.

Since we are looking at only one side of the sheet of crimped screen, it is not obvious from the picture, but it can be—I observed it myself in the filter, that a similar deposit had taken place on the upstream side, on the underneath side of a crimp.

The Court: Upstream side?

The Witness: Upstream. If the air is flowing from left to right through Exhibit 3, then, the upstream side of a crimp would be this surface right here (indicating) which is angled to the air flow, and the dirt you see in photograph——

The Court: 9-C.

The Witness: ——9-C is collected on the top of that. Underneath, if we were to look up through

(Testimony of Sydney F. Duncan.)

the bottom of the back, we would see a similarly disposed portion of screen mesh passage wall that would show a similar dust deposit. It just doesn't show in the picture too well.

It should be stated or noted that the dust has deposited heavily at the front of the filter and lightly toward the back, and that there is no deposit of dust visible at this time in this photograph after the change in direction of the [105] crimp.

After loading 70 grams into the air stream, the results shown in photograph 9-D are obtained, and in this photograph it appears that the walls of the passages toward the front of the filter are becoming quite well loaded with dust and that some small amount of dust is visible, particularly towards the right-hand side of the photograph of the crimped portion of the filter.

There is dust deposited after the change in direction and that part of the filter is beginning to load up.

Examination of the flat screen in photograph 9-C shows an obvious deposit of dust on the flat screen. This deposit has not been as visible in other photographs, but examination with a magnifying glass at the time of the tests showed that dust was collecting on the flat texture during the entire test, but at a slower rate.

The dust was disclosed after loading 90 grams into the air stream, and the filters, upon being separated and photographed, gave the results of 9-E, where the filter is heavily loaded with dust

(Testimony of Sydney F. Duncan.)

toward the front part and in many cases quite heavily loaded with dust after the change in direction of the crimp.

The Court: That looks like it is almost caked there. Is that the top of the crimp or at the valley of the crimp?

The Witness: It is in along the sides of the crimp. [106]

The Court: Oh, I see.

The Witness: The flat screen contacts the top of the crimp, and so, as we separate the filter, we are bound to disturb some of the dust there. So that the flat cake that you see is deposited on the sides of the crimp.

The Court: Then, on the upstream side, on the right-hand side of each one of these ridges, it appears to be caked, and on the downstream side at the left side.

The Witness: That is after the change in direction of the crimp.

The Court: Yes.

The Witness: That is true. On the right-hand side of the ridges, as you refer to them, the crimps on the lower part of the filter, there will be a dirt deposit which can be seen, or could be seen from the back of the photograph, so to speak, that would look very much like the dirt deposit which is shown so obviously by the photograph.

Photograph 9-F is approximately a 10-diameter magnification of a portion of the flat screen in photograph 9-E and shows how the dirt is stacked

(Testimony of Sydney F. Duncan.)

up on the individual wires; the air flow in photograph 9-F, well, I can't say that it is from left to right, because nobody looks at it the same as I do—there is at one edge of the photograph a double line of wire. That side of the photograph is the upstream side, and the air has been blowing dust toward the wires. I think examination [107] of the little stacks of dust, as they are piled up on the wire on one side, will indicate that these stacks of dust were pointing into the air stream.

The Court: That the stacks of dust were pointing into the air stream?

The Witness: Were pointing into the air stream.

The Court: This would be indicated by 9-E?

The Witness: By 9-E, yes.

The Court: All right: 9-G?

The Witness: 9-G is an oblique view of the flat screen at the end of the test and shows the herring-bone pattern of dust deposit and its darkness at the upstream face of the filter and slightly shading off at the back.

9-H was taken before and was just taken to show what kind of a thing we had and that the back of the filter was relatively clean.

9-I and 9-J are enlarged details of the dust deposit shown in 9-E on the crimped portion of the filter.

9-J shows very definitely the heavy load toward the lower part of the photograph, that is, the part of the photograph which is actually in focus. With a short-focus lens and a curved focus, it is difficult

(Testimony of Sydney F. Duncan.)

to get the whole thing in focus. So the best focus is at the point where the air enters the filter, and the dust load tapers off. It is heaviest toward the air-entering side and progresses through the filter as the [108] meshes of the screen toward the front of the filter become clogged or partially clogged with dust, the air flows down the passage and deposits its dust on relatively clean screen toward the center of the filter.

Mr. Leonard S. Lyon: I have had Exhibit No. 8 and Exhibits 9-A to 9-J marked. I would like to have them formally received in evidence.

The Court: They will be admitted.

(Said Plaintiff's Exhibits Nos. 8 and 9-A, 9-B, 9-C, 9-D, 9-E, 9-F, 9-G, 9-H, 9-I, and 9-J, previously marked for identification, were received in evidence as aforesaid.) [109]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Does Exhibit 8 show and describe the test apparatus employed in the test from which the curves you have identified in Exhibit 7 and Exhibit 8 were derived?

A. Yes. The test set is shown by photograph and in drawings and is described in words in Exhibit 8.

Q. Referring to Fig. 9, the photograph in Exhibit 8, is that test set shown at the rear of that photograph?

A. The large test extending from one side of the



(Testimony of Sydney F. Duncan.)

picture to the other side of the picture is the test set in which the full-sized, or 20 by 20 inch panel filters are tested.

Just a portion of a smaller test set built to accommodate 7 inch square filters is shown at the extreme left just about the middle of that photograph. It was in the large test set that the data was taken for the published curves [110] and the photographs of Exhibit 9 were made from a filter which was fed dust in the small test set shown just at the left of the picture.

Q. The large test set that you have referred to is adapted for continued operation to show whether or not the filter efficiency and pressure drop remain constant over a period of time?

A. The large test set is built so that it can be run almost continuously and it is in that test set that we determine the pressure drop characteristics, the efficiency characteristics and the dirt-holding capacity of the 20 by 20 panel filters.

Q. Over a period of time?

A. Over a period of time, yes. The test is run for anywhere from 20 to 100 hours depending upon the test conditions and the filter being tested.

Q. Now the small test set is adapted to test only 7 by 7 panels?

A. Yes. The actual inside of the small duct is 6 inches by 6 inches, and it is equipped with a blower that can produce much higher velocity than we can obtain in the large test set.

Q. I show you a photograph——

I will ask that this be marked Exhibit 10. [111]

(Testimony of Sydney F. Duncan.)

(The photograph referred to was marked Plaintiff's Exhibit No. 10 for identification.)

By Mr. Leonard S. Lyon:

Q. —and ask you if this is a photograph of the small test set you have referred to.

A. Yes, this is a photograph of the small test set.

Q. Is that test set adapted for measuring the characteristics of the filter over a period of time of operation or only for an initial measurement?

A. It can be used to measure filter characteristics over a period of time but it is not equipped with the automatic controls so we customarily use it for short duration tests of an hour or two perhaps to determine the initial characteristics or to determine the operation of the filter under extremely high dust concentration.

Q. Was this small test set the apparatus on which the tests were made which are shown in the photographs, Exhibits 9-A to 9-J?

A. Yes, it is.

Mr. Leonard S. Lyon: I will offer in evidence the photograph of the small test set as Plaintiff's Exhibit 10.

The Court: Admitted.

(The photograph referred to was received in evidence and marked Plaintiff's Exhibit No. 10. )

Mr. Harris: If the Court please, I would like to have [112] some foundation as to who owns

(Testimony of Sydney F. Duncan.)

this equipment shown in these photographs. I think that is part of the foundation.

By Mr. Leonard S. Lyon:

Q. Will you answer Mr. Harris' question? He wants to know who owns the equipment.

A. The Farr Company owns it.

The Clerk: Are all these photographs in evidence?

The Court: All these photographs are in evidence; 9 and 10, 9-A to 9-J and 10.

By Mr. Leonard S. Lyon:

Q. You have testified that you appeared as a witness in the trial before Judge Yankwich on the Green patent, which has been included in the defendants' book that has been marked here.

I show you a panel which has been marked Plaintiff's Exhibit 5 for identification and ask you if you can identify that panel.

A. (Examining exhibit) This panel is an example of the Air-Maze filter made according to the teachings of the Green patent and marketed, as far as I know, for a number of years.

Q. Can you recognize that as the panel put out by the Air-Maze Company under the Green patent which was involved in the suit before Judge Yankwich in which you testified?

A. This appears to me to be very similar to the filter [113] panels I remember seeing in that suit. Whether it is the identical one or not, I don't know.

Q. But you recognize that as a specimen of that panel?

A. A specimen of that filter.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: I will offer in evidence the panel of the Green patent which the witness has just identified as Plaintiff's Exhibit 11.

The Clerk: It is already marked.

The Court: It is already marked 5, is it not?

Mr. Leonard S. Lyon: Excuse me. Exhibit No. 5.

The Court: Very well. Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 5.)

By Mr. Leonard S. Lyon:

Q. Have you made——

The Court: On this panel, which is the upstream side, as you call it?

The Witness: This side with the coarse mesh screen on it is the upstream face, and this face with the fine mesh screen is the discharge or downstream face.

The Court: Is there just one fine mesh screen in the panel?

The Witness: This particular panel has holes at the bottom through which one may look and see the arrangement of the screen. There is a coarse screen for several layers and [114] then there is some finer screen. In this one there appears to be alternate layers of flat and crimped screen, and then there is a flat screen on the back of the filter.

There are several layers.

The Court: There appear to be three layers of fine mesh screen.

What is the size of the coarse mesh screen? What do you call that?

(Testimony of Sydney F. Duncan.)

The Witness: That appears to be about one-half inch or three-eighths mesh.

The Court: That is the size of the opening?

The Witness: Yes.

The Court: And you call the other one No. 14 screen?

Mr. Leonard S. Lyon: 14 mesh.

The Court: That is 14 holes per square inch?

The Witness: That is 14 holes per lineal inch.

This one on the back is about 14 mesh and would be determined by simply laying a ruler on and counting the holes in the lineal inch.

The Court: What is the front, the larger?

The Witness: It is approximately  $\frac{3}{8}$ .

The Court: Three-eighths per——

The Witness: Three-eighths of an inch per hole.

The Court: Per hole?

The Witness: Instead of about 14th of an inch per hole. [115]

The Court: I see.

By Leonard S. Lyon:

Q. In what direction relative to the flow through the filter do the sheets extend in this Exhibit 5?

A. The sheets in Exhibit 5 are perpendicular to the intended direction of flow of the air or medium to be filtered.

Q. Now will you contrast the operation of that filter with the operation of the Farr filter of the patent in suit?

A. In the operation of the filter, Exhibit 5, the filter is usually used oiled so that the air entering

(Testimony of Sydney F. Duncan.)

flowes through the meshes of each one of the layers of screen in sequence and as it flows by the individual wires of the screen in passing through the meshes the turbulence is caused and dust is deposited on the wires. [116]

\* \* \* \* \*

The Witness: As the dust load on the filter increases with time in service or time in test, the small meshes towards the back of the filter are clogged to a more or less extent, causing a rise in the pressure drop across the filter for a given air flow. With this filter, when tested or in service, eventually the pressure drop across the filter will rise to a considerable degree, because the small holes in the fine mesh at the back of the filter become plugged with dirt and so stop the flow of air.

This filter, then, in operation in a normal ventilating system would interpose an increasing and, towards the latter part of its life, a rather rapidly increasing pressure drop and so decrease the flow of air in the ventilating system, because in the ventilating system the fans are set to run at practically constant speed and there is no provision for increasing the speed of the fan or the total pressure produced by the fan to compensate for the increased pressure drop across the filter.

By Mr. Leonard S. Lyon:

Q. Have you tested in your large-scale test apparatus, which has been identified here, panels like Exhibit 5 and made [118] comparative tests in

(Testimony of Sydney F. Duncan.)

that apparatus of such panels with the Farr panels like Exhibit No. 2?      A. Yes, sir, I have.

Q. I hand you a sheet of curves, which I will ask be identified as Exhibit No. 11, and ask you if this exhibit records the results of those tests.

A. Yes, it does.

\* \* \* \* \*

(The sheet of curves referred to was marked Plaintiff's Exhibit No. 11 for identification.)

The Witness: The set of curves shown as Exhibit No. 11——

The Court: What kind of dusts were used, the same dusts [119] that were used in the other tests?

The Witness: The same dust has been used as in the tests described in the technical report, the tests described in the bulletin, Exhibit No. 7, and the same dust was used in loading the filters shown in the photographs, shown in Exhibits 9-A through 9-J. The same dust has been used in each one of these tests.

The Court: Including the tests of this product?

The Witness: Including the tests of a sample of this type of filter.

The Court: Exhibit No. 5?

The Witness: Exhibit 5.

Mr. Leonard S. Lyon: No. 5.

The Court: All right.

The Witness: The curves——

The Court: Well, you introduced the air at different speeds, did you not?

(Testimony of Sydney F. Duncan.)

The Witness: Yes, because at the time or approximately at the time when the Farr filter was first brought out, panels of this general type were rated at 800 cubic feet of air per minute, whereas, panels of the Farr type were rated at 1200 cubic feet of air per minute for the same size panel.

The two lower curves, labeled "Farr Pressure Drop at 519 Feet Per Minute" and the curve labeled "'Air Maze Type B' Pressure Drop at 346 Feet Per Minute," show that at the [120] beginning of this test the pressure drop across the two filters under these different conditions of velocity were approximately the same.

By Mr. Leonard S. Lyon:

Q. Now, will you explain to the Court a little further why you used these two different velocities for the two filters?

A. As I said, the two filters were rated that way when the Farr filter was first brought out.

Q. In other words, the earlier Air-Maze filter of this Exhibit No. 5 type, its rated flow was what, commercially?

A. 800 cubic feet per minute.

Q. And the Farr filter?

A. It was 1200 cubic feet per minute, just 50 per cent more air.

Q. So you made the comparative tests using the proper rated flow rates for each one of the two filters?

A. For each one of the two filters.

The Court: Who rated them? Where did you get the 800 cubic feet per minute rating?



(Testimony of Sydney F. Duncan.)

The Witness: That was a recommendation made to the trade.

The Court: By whom? By Air-Maze?

The Witness: By the people who sold Air-Maze filters.

The Court: Now, the graphs here—— [121]

The Witness : The pressure drop curve.

The Court: The pressure drop curve shows the pressure drop going up from——

The Witness: From a little over a tenth of an inch to a half inch for the Air-Maze Type B; and for the Farr filter from just about a tenth of an inch to just about 15/100 of an inch. It is to be noted that the curve for the pressure drop on the Air-Maze filter that I tested was stopped at a half inch of water; that the curve for the Farr filter actually, from the test data, the test was carried beyond the 1,000-gram loading, but the rest of the data was simply not plotted on this sheet. The curve continued on without any serious break, and just about its present level at the end of the curve.

By Mr. Leonard S. Lyon:

Q. Why did you terminate the test insofar as the Air-Maze device, Exhibit No. 5, was concerned, when you had reached the point indicated on the exhibit?

A. According to a more or less generally accepted standard by the people who manufacture filters, but no particularly codified, there is a point at which we say the filter has reached its dirt-holding capacity. One of the specifications that

(Testimony of Sydney F. Duncan.)

has been suggested and adopted in some areas is that, for this particular type of filter, if the pressure drop across the filter reaches half an inch of water, then, the filter is at the limit of its dirt-holding [122] capacity and should be removed from the air stream and cleaned or reconditioned.

Another specification for determining when a filter has reached its dirt-holding capacity is that such capacity shall have been considered to be reached when the efficiency of the filter drops to 85/100 of the initial efficiency.

The Court: Now, this efficiency line shows that the Air-Maze has increased in efficiency——

The Witness: That is correct.

The Court: ——the dirtier it got.

The Witness: The dirtier it got, the better strainer it was, because as the small openings in the fine mesh became plugged, there were smaller and smaller holes for dirt particles to pass through, and so the collecting efficiency rose. However, the pressure drop also rose to be about five times its original value.

Whereas, the pressure drop in the Farr filter shown on these curves only rose to be about one and a quarter times its initial value, and that at 1,000 grams loaded on a 20-by-20 panel compared to the 860 or so grams loaded on the Air-Maze.

By Mr. Leonard S. Lyon:

Q. Now, as shown by this Exhibit No. 11, does the earlier Air-Maze filter of Exhibit 5 type have the characteristic performance which you have explained as had by the Farr filter of the patent in suit? [123]

A. No, it does not.

(Testimony of Sydney F. Duncan.)

Q. Will you point out to the Court wherein Exhibit No. 11 shows this difference?

A. Exhibit No. 11 shows this difference principally in the shape of the pressure drop curve. In the Farr filter, even though the velocity is 50 per cent more than through the Air-Maze filter I tested, the pressure drop rose very slowly, due to the fact that there are passages through the filter allowing the air to by-pass dirty screen, encountering farther into the media some clean screen, and so resume the flow partially through the screen and partially along the passages.

The efficiency curves of the Farr filter and the Air-Maze filter show that the Farr filter, having an efficiency quite—well, it is a little higher in this particular test—the efficiency of the Farr filter decreases as it becomes dirty, thus showing that, as the screen becomes loaded with dirt, the air by-passes the dirty screen and, encountering cleaner screen farther into the media, begins to deposit dirt. After the dirt load has reached the bend in the screen, then the air is channeled down the first portion of the herringbone pattern crimp and encounters a change in direction at the crimp, thus re-establishing, if it has been disturbed, the partial flow through the screen and through the mesh.

When dirt begins to clog up the openings well into the filter, the flow is then down coated channels and very [124] little dirt deposit takes place. The efficiency, then, of the Farr filter decreases.

In the Air-Maze filter, there are no passages through which the air may by-pass dirty screen,

(Testimony of Sydney F. Duncan.)

and the increasing degree to which the fine meshes are plugged causes a rise in efficiency.

Actually on this particular test, at two point, the velocity in the duct was increased to 1200 cubic feet per minute at a point.

The Court: On?

The Witness: On the Air-Maze filter.

The Court: Yes.

The Witness: To give some kind of comparison between the pressure drop across the Air-Maze at the Farr capacity, at 500 grams into the load on the filter, this pressure drop was measured as .34 inches of water, just about three-eighths of an inch of water. At the end of the test, or 860 grams, the velocity was again increased on the Air-Maze to pass 1200 cubic feet per minute, and the pressure drop across the filter was .93 of an inch of water.

The Court: It is not charted.

The Witness: No, it is not charted because of the difference in capacity. .93 of an inch, incidentally, would be off of the page on the pressure drop scale. [125]

If the two pressures at 1200 CFM are compared, then we see that at 860 grams load the Farr filter has approximately 13/100 of an inch pressure drop and the Air-Maze filter would have a 93/100 of an inch pressure drop.

These characteristics of the curves show that there is a different type of operation taking place in the collection of dust by the filter.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Exhibit 11 is offered in evidence as Plaintiff's Exhibit 11.

The Court: Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 11.)

[Printer's Note: Plaintiff's Exhibit 11 is reproduced in Book of Exhibits.]

By Mr. Leonard S. Lyon:

Q. You have used the terms "filter efficiency" and "filter capacity" in your testimony. You have already explained how filter efficiency is determined. Is filter capacity the same as filter efficiency? If not, what is it?

A. Filter efficiency is strictly a measure of the ability of the filter media to take dust out of the air.

The capacity of the filter could be either one of two things and is sometimes referred to, one is the dirt-holding capacity (of which I spoke) and the other one is its ability to handle a certain volume of air in cubic feet per minute.

Usually the 20 by 20 filter size, which is the size of these two exhibits, Exhibit 2 and Exhibit 5, is the capacity [126] of that particular size as given in most manufacturers' literature.

The Court: What, the dirt capacity?

The Witness: The air capacity.

The Court: The air capacity?

The Witness: Yes.

The Court: That is what you refer to here by 800 cubic feet per minute capacity and 1200?

(Testimony of Sydney F. Duncan.)

The Witness: Yes, sir, that is the air capacity, the ability of the filter to handle a certain volume of air.

By Mr. Leonard S. Lyon:

Q. Am I correct, do you mean to state that the filter of the patent in suit had a greater capacity than the filter of the Exhibit 5 type?

A. Yes, it has, about 50 per cent more at comparable pressure drops and efficiencies.

The Court: Is there any advantage or disadvantage in that?

The Witness: A definite commercial advantage in that the total area occupied by a bank of these filters to handle a given quantity of air will be smaller if our filters are used. It will be only about two-thirds of the area necessary with the lower air capacity filters.

By Mr. Leonard S. Lyon:

Q. In an air-conditioning system such as might be employed [127] in a building like this, where would the filter panels usually be located in the building?

A. Well, they can be located at a variety of places. Some of them are on the roof and some of them are located in the basement.

The Court: Are they located at the outlets such as the outlets here in this room?

The Witness: No, they are not. They are generally located close to the fans.

The Court: Close to the intake?

(Testimony of Sydney F. Duncan.)

The Witness: Close to the intake, because one of the functions of the filters is to prevent the deposit of a lot of dust in the duct system itself. By Mr. Leonard S. Lyon:

Q. Can you tell us to what you attribute the increased filter capacity of the design of the patent in suit as compared with Exhibit 5?

A. Well, the increased filter capacity dust to the essential features of the construction of the Farr filter; that is, in the Farr filter we have many layers or sheets of crimped screen mesh in which the crimps form passages through the filter.

A second feature of course is the fact that the crimped screen divides the face of the panel into a multiplicity of subdivisions in both dimensions of the face of the panel. [128]

And the third feature is that in the Farr filter the passages formed by the crimped screen are at angles, one portion with respect to the other so that the passage includes a rather abrupt change in direction.

And these things contribute, singly and in combination, to the superior dirt-holding capacity found in the Farr filter.

Q. Are you familiar with the standards or requirements that were expected to be met by air filters such as Exhibit 5 at the time the Farr filter was first brought on the market?

A. I studied the test procedures used by various laboratories to determine filter efficiency and studied the equipment that was used.

(Testimony of Sydney F. Duncan.)

Q. What effect, if any, on these requirements was had by the advent of the Farr filter, the patent in suit, if you know? [129]

\* \* \* \* \*

The Witness: The effect was that through the greater air handling capacity of the Farr filter, installations were possible occupying less area and so it made a more economical construction job for the users.

The superior dirt-holding capacity made for less maintenance of the filter, so it cost less to keep the filter clean.

The Court: In the business of supplying filtered air in an air-conditioning system, are there any general standards by which the amount of air, that is, the required amount of air, are established? For instance, here is a room this size. Now in the air-conditioning business are there some standards which say that a certain number of cubic feet of air should be introduced into this room every so often?

The Witness: No, sir. Requirements vary considerably depending on the occupancy of the room or the requirement of the room. They are usually specified or quite commonly specified as so many air changes per hour.

The Court: Other than for special purposes, such as, for instance, in a meat storage house or a warehouse or anything where people are working and living, that is where most installations are, are they not?



(Testimony of Sydney F. Duncan.)

The Witness: Yes.

The Court: Well, now, is there some standard on the air changes per hour? [130]

The Witness: We might have anywhere from two to seven or eight air changes per hour in occupied space.

The Court: Then your testimony is that by virtue of the increased capacity it costs less to install the Farr filters and to produce a greater amount of air?

The Witness: Or the same amount of air.

The Court: Or the same amount of air?

The Witness: Or to handle the same air.

The filters do not dictate the amount of air that we need in this room; it is the use of the room that dictates the amount of air.

Then it is up to someone to design a filter installation that will handle that amount of air on some kind of an economical basis.

The Court: Well, they solved it here by pasting a paper over the thermometer so that nobody can tell how hot or cold it is.

The Witness: There is one other difference between Exhibit 2, the Farr filter, and Exhibit 5, the Air-Maze filter, and that is that the Farr filter, through the fact that it has rather sizable passages through it, is a good deal easier to clean than the Exhibit 5 filter.

The Court: How are they cleaned?

The Witness: There are a variety of methods.

The Court: Do they wash them with gasoline?

(Testimony of Sydney F. Duncan.)

The Witness: You wash them with—well, gasoline might be used except it is a little dangerous. But usually they are sprayed with water and then washed with a spray of caustic solution, rinsed with water, dried and put back in service.

In the fine screen through which everything has to flow in the Air-Maze filter of the type of Exhibit 5, it limits the size of the passage, the size of the hole, through which the dirt can be washed.

In the Farr filter the dirt collects as shown in the photographs of Exhibit 9-A through J on the wires adjacent to the passage and this dirt can be loosened with a spray of water or caustic and comes out into the passage and goes through the filter by passing through the passage rather than having to pass through the fine mesh screen.

The cleanability, of which there is no particular measure, incidentally, but in practice I have observed that the Farr filter is easier to clean than a filter having fine mesh screen through which everything has to go.

By Mr. Leonard S. Lyon:

Q. Are you familiar with the P-5 Air-Maze filter panel?

A. I have examined some panels labeled so, and I think I am familiar with them.

Q. Have you made various tests on them?

A. Yes, an Air-Maze P-5 panel was tested in our large [132] test duct using the same——

The Court: Are you through with this one for the moment?

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Yes, Your Honor.

The Court: The clerk will remove it.

By Mr. Leonard S. Lyon:

Q. Had you finished your statement?

A. I think so. I said I had tested an Air-Maze P-5 filter in the large test duct.

Q. I show you a 20 by 20 air filter panel and ask you if you can identify that as one of the Air-Maze P-5 filter panels.

A. I think it is one of the Air-Maze P-5 panels.

The Court: Is it so labeled?

The Witness: It has a P-5 stamped up here in the corner and this particular one doesn't have another nameplate.

Another filter which looks just like this has "Air-Maze P-5" stamped on a little brass plate so that examining these two filters together previously I determined that they were the same filter, the same kind of filter.

Mr. Leonard S. Lyon: Mr. Baldwin, do you see anything wrong with this filter as being an Air-Maze P-5 filter panel?

Mr. Baldwin: It is hard to tell, Your Honor, because from the face the P-5 obsolete and the P-5 look the same.

However, I won't question it at this time.

The Court: You have a P-5 obsolete here, the one that [133] you were showing, have you not?

Mr. Baldwin: We have a small sample, Your Honor. It is on the desk.

Mr. Harris: It is labeled Defendants' Exhibit A for identification.

(Testimony of Sydney F. Duncan.)

The Clerk: It is not in evidence.

The Court: No, just for identification.

Mr. Baldwin: I think this is the P-5.

The Court: The current P-5?

Mr. Baldwin: Yes.

The Court: Do you so stipulate?

Mr. Baldwin: So stipulated.

The Court: Very well.

Mr. Leonard S. Lyon: We will offer the panel just identified as Plaintiff's Exhibit 12.

The Court: Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 12.)

By Mr. Leonard S. Lyon:

Q. Have you dismantled panels like Exhibit 12 and examined the filter medium therein?

A. Yes, I have.

Q. I show you an exhibit marked Exhibit 6 and ask you if you can identify this exhibit.

A. (Examining exhibit.) [134]

The Court: This Exhibit 12 has the heavy wire over the edge.

The Witness: It has a protecting layer of expanded metal over the face, over each face.

The Court: Is not the wire the same as expanded metal?

The Witness: No, expanded metal is made out of sheet and slit and deformed to come out this way, whereas the wire mesh——

The Court: This is not wire?

(Testimony of Sydney F. Duncan.)

The Witness: While the wire mesh material is woven like cloth.

The Court: Very well:

By Mr. Leonard S. Lyon:

Q. The practice of mounting a grille in front of these or back or either one to protect these filters is common to all these various filters, is it not?

A. Yes.

Q. The plaintiff sometimes puts grilles on its filters? A. Oh, yes.

Q. And do the grilles perform any part of the filtering operation? A. Almost none.

Q. Why?

A. In the first place the holes are rather large, there is only layer of it that could collect dust, so that the [135] grille itself doesn't have much dust-holding capacity, and it is so shallow that it cannot act as a very effective filter.

Q. What are the grilles used for?

A. The grilles are used to protect the surface against accidental bumps, to improve handling, to perhaps make the filter a little more rigid which it is taken out for cleaning, and various reasons of that sort.

Q. I have handed you Exhibit 6 and ask you if you can identify that exhibit.

A. These are sheets of crimped screen taken from an Air-Maze P-5 filter and bound together at one end just for purposes of examination and illustration of the construction of the filter media in the current Air-Maze P-5 filter.

(Testimony of Sydney F. Duncan.)

Q. I would like you to compare this Air-Maze P-5 filter material with the filter material of the Farr patent in suit. First, is it made of screen mesh?

A. Yes, it is made of screen mesh or wire screen. This media has sheets of crimped screen or wire screen positioned parallel to the intended flow of the medium to be filtered. These crimps, when the filter is packed, form a multiple subdivision of the panel in both dimensions of the panel and these crimps change in direction twice instead of once.

Q. The Farr patent in suit shows one change?

A. Shows one change in direction, where this medium [136] shows two changes in direction rather close to the surface of the filter panel.

Q. Does the P-5 Air-Maze filter material, does it have any flat sheets?

A. The filters that I have seen labeled P-5 do not have flat sheets in them.

Q. Based on your tests and studies of the filter of the Farr patent in suit, are the characteristic performances of that filter or its increased filter capacity dependent on the presence of flat sheets in the filter medium?      A. Not necessarily.

Q. Have you made a comparative test in the large-scale test apparatus which you have heretofore identified using a P-5 Air-Maze 20 by 20 filter panel like Exhibit 12 and a Farr 20 by 20 filter panel like Exhibit 2?      A. Yes, I have.

Q. Have you recorded the results of those tests on a paper that can be produced here in court?

(Testimony of Sydney F. Duncan.)

A. I have some curves here——

The Court: Mark it 13.

(The document referred to was marked Plaintiff's Exhibit No. 13 for identification.)

The Court: This is another graph?

Mr. Leonard S. Lyon: This is another graph, Your Honor.

The Witness: This is another graph. [137]

The Court: This is a graph on the type P-5?

The Witness: Yes, sir.

By Mr. Leonard S. Lyon:

Q. Now will you state how these tests were made and tell us what the results of the tests were and explain the recording of those tests on this Exhibit 13?

A. In the tests shown on Exhibit 13, which is a curve sheet labeled "Comparative Filter Performance, 20 x 20, 2 Inch Panels," the air velocity for both the Parr filter and the Air-Maze filter were the same. That is just another way of saying that each one of the filters was handling 1200 cubic feet of air per minute in the test at the time.

Q. Did you find that the P-5 filter has the same increased filter capacity that you have said is provided by the Farr patented filter?

A. Very close to the same. The two curves——

The Court: The same dust?

The Witness: The same dust as previously used, fed at the same rate as the tests shown in Exhibit 11. It was the same test set.

(Testimony of Sydney F. Duncan.)

The three filters involved——

The Court: Well, it was the same rate.

The Witness: Twenty grams of dust per hour.

The Court: Not as Exhibit 11 but in Exhibit 11 you had two? [138]

The Witness: I had two air rates but the same dust rate. It was 20 grams of dust fed per hour.

Actually in Exhibits 11 and 13 there are three filters involved. One is the Farr, what we call the old type Air-Maze or Type B, and the third filter is the Air-Maze Type P-5.

The efficiency and pressure drop curves for the Farr filter on Exhibit 11 and Exhibit 13 are the same curve. They are plotted from the same data.

The dust fed to all three filters was the same dust, the same kind of dust as far as any kind of standardization could make it.

The oil used to coat the wires with some adhesive was the same for all three filters.

The test method was the same for all three filters.

The test equipment was the same for all three filters.

The only difference in treatment of the three filters is that the Air-Maze P-5 was tested at 1200 cubic feet of air per minute and the Air-Maze Type B shown on Exhibit 11 was tested at 800 cubic feet of air per minute.

By Mr. Leonard S. Lyon:

Q. What is the rate of capacity, if you know, of the Air-Maze P-5 filter panel?

A. I don't know what Air-Maze rates it at, but



(Testimony of Sydney F. Duncan.)

the filter performs quite well at 1200 CFM. [139]

The efficiency of the Air-Maze P-5 is shown in the dashed line on Exhibit 13 and is slightly lower than the solid line which shows the efficiency of the Farr Type 44, or the filter Exhibit 2.

It will be noted that the pressure drop of the Air-Maze P-5 filter follows the pressure drop of the Farr filter almost exactly as nearly as we could measure it, at least from zero grams dust load out to 400 grams dust load on the filter. At this point the pressure drop of the Air-Maze P-5 rises a little faster than the pressure drop of the Farr Type 44.

Q. Will you explain whether or not the curves on Exhibit 13 show that the Air-Maze P-5 filter has a characteristic performance of the Farr patented filter as you have heretofore explained it?

A. Since the curves on Exhibit 13 are very like each other for the Farr filter and the Air-Maze P-5, it appears that the filters perform in similar manner.

However, further examination would have to be made of the performance of the Air-Maze P-5 to determine whether or not this similarity of efficiency and pressure drop characteristics was due to a similarity of internal action or to some other factor.

Q. What examination of that kind have you made?

A. A 7 by 7 filter similar to the one used in producing [140] the photographs of Exhibits 9-A

(Testimony of Sydney F. Duncan.)

through J was constructed and tested in a fashion similar to the test run on the filter that produced the photographs of Exhibit 9.

Mr. Leonard S. Lyon: At this time I will offer in evidence Exhibit 13.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 9.)

[Printer's Note: Plaintiff's Exhibit 13 is reproduced in Book of Exhibits.]

By Mr. Leonard S. Lyon:

Q. Can you produce the photographs that you last referred to?      A. Yes, I have a set here.

The Court: By the way, how do you account for the fact that the efficiency rating of the Air-Maze dropped faster than that of the Farr?

The Witness: There is a little less screen I think in the Air-Maze P-5 than there is in the Farr filter.

The Court: Due to the fact that you have the flat screen in between?

The Witness: Not necessarily. The Farr filter tested has four layers or sheets of crimped screen per inch, and the Air-Maze P-5 has five. The mesh of the screen is not identical in the two filters.

The Court: What is that in the P-5?

The Witness: The P-5, I think, is a 16-mesh screen. It is a little difficult to determine without a flat piece to look at. The mesh is somewhat distorted by the action of the crimping machine.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. You have produced, in response to my last request, a series of seven photographs, which I will ask to be marked as Exhibits 14-A, 14-B, 14-C, 14-D, 14-E, 14-F, and 14-G.

(Said photographs were marked Plaintiff's Exhibits Nos. 14-A, 14-B, 14-C, 14-D, 14-E, 14-F, and 14-G, for identification.)

\* \* \* \* \*

Q. Were the tests shown in the Exhibits 14-A to 14-G made in the small test apparatus which you have heretofore identified?

A. Yes, they were. [142]

Q. And were they made under exactly comparable conditions to the tests shown in Exhibits 9-A to 9-J?

A. Yes, they were made with the same apparatus, with the same air velocity. The filters were oiled with the same oil and allowed to drain the same length of time.

The Court: With the same dust?

The Witness: And the same dust was fed in 10-gram increments, in the same fashion as the tests run that produced the photos of Exhibits 9-A through 9-J.

The Court: And in the same quantity?

The Witness: In the same quantity per run. Not the total same amount.

The Court: I understand.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Will you take the photographs showing these runs with the Air-Maze P-5 filter and point out to the court what the photographs show?

A. The same small filter frame was used.

The Court: Which way was the flow of air on these, incidentally, from top to bottom?

The Witness: The flow of air in the photographs in Exhibit No. 14 is from the top to the bottom.

The Court: Instead of from bottom to top?

The Witness: Instead of from bottom to top. My photographer just took them the other side up.

The first photograph shows the two parts of the filter separated and shows the media as it was clean and oiled before any dust had been fed to it.

Then, after each 10-gram increment of dust feed, the filter was separated and the inner face examined.

Photograph 14-B shows the condition of the filter after 20 grams of dust had been fed into the air, and it is to be noted that the light areas in the upper part of the lower half of the filter are dust deposits on the wire. The air was entering from that side. These same dust deposits are not quite so clearly visible in the upper half of the filter, but there is an indication that the progressive type of loading previously described, in talking about the photos of Exhibit 9-A through 9-J, is taking place.

The dust load in 14-B appears up to the first change in direction of the crimp.

In 14-C, 30 grams of dust had been fed to the filter and the light areas in the first short section

(Testimony of Sydney F. Duncan.)

of the crimp and in the middle section of the crimped sheet of screen are dust deposits on the wire.

The deposit in the middle section is caused by the change in direction of the crimp.

After 40 grams of dust had been fed to the filter, the appearance of the inner face was as is shown in photograph 14-D, and in 14-D a small amount of dust is seen to be [144] deposited on the wires near the downstream face of the filter, which is the lower part of each section of the filter.

The Court: At the extreme edge?

The Witness: At the extreme edge, yes.

After 50 grams of dust had been fed, the inner face of the separated filter panel looked as in 14-E. The heavy dust deposit near the top of the filter, which is the upper side of each piece, has almost closed many of the openings.

Careful examination shows that in the bottom of some of the crimps, dust deposits can be seen as if they were on the other side of the wire where the air was passing through a passage through the filter below the layer of screen that is visible on the top of the separated filter.

Exhibit 14-F is a close-up of one portion of the screen and is characteristic of the dust deposit on the crimped screen sheet.

By examination of the intensity of the deposit, it appears as to which way the air is flowing.

There is no particular distinguishing mark that I can call attention to, but on one edge of the filter,

(Testimony of Sydney F. Duncan.)

of the photograph, there is quite a heavy dust deposit. On the opposite edge, more clean wire is observed.

The Court: The air flow on this is from this way (indicating), or what is it? [145]

The Witness: On the copy of the photograph, it is from left to right, yes.

The Court: It appears to me as though there is dust on all the wires going crosswise in the direction of the flow. None appear to be clean.

The Witness: They have all, so far as I **can** observe, accumulated some dust and in each case on the upstream side of the wire, just as was shown in the similarly enlarged views of the Farr type filter, the photographs of which are Exhibit 9.

The last picture, Exhibit 14-G, is a photograph taken at approximately 10 diameters magnification of the dust deposit on the wires, and it is seen that the dust deposit is of the same general character as was observed in Exhibit No. 9.

By Mr. Leonard S. Lyon:

Q. You have testified that the medium in the P-5 Air-Maze filter forms multiple subdivisions both in a horizontal dimension and in a vertical dimension. [146]

\* \* \* \* \*

The Court: I think he testified to that when he was describing it.

The Witness: I believe I did.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. You so intend, do you not, to testify?

A. I did.

Q. Yes. Now, I show you a catalog of the defendant Air-Maze Corporation for the P-5 filter, Exhibit No. 4. On the second page of this catalog, in the lower right-hand corner, are two illustrations. Will you refer to the first or top of those illustrations and point out to the Court whether or not such illustration shows the multiple subdivisions that you have referred to?

A. The picture referred to, on page 2 of Exhibit No. 4, shows what appears to be a face view of the P-5 media. If one were to assume that a particle entered one of these openings on the face of the filter and tried to go laterally immediately after entering the opening, it would encounter a [147] wire mesh through which it would have to pass in going laterally to the air flow. The fact that from the photograph it appears that the wire mesh would have to be traversed or passed through in any direction of lateral travel of a particle, this media subdivides the filter panel in both dimensions of the face of the panel into a multiplicity of subdivisions. [148]

Q. I show you a plastic specimen which consists of one relatively larger piece and two smaller pieces and ask you if you produced this specimen.

A. Yes, I did.

Q. What is it and what did you produce it from?

(Testimony of Sydney F. Duncan.)

Mr. Harris: If the Court please, may we examine it before the witness answers?

The Court: Certainly.

(Counsel examining exhibit.)

By Mr. Leonard S. Lyon:

Q. Go ahead, Mr. Duncan.

A. This 3-piece plastic exhibit was made by taking some Air-Maze P-5 media, enclosing it in a mold and pouring the mold full of some relatively clear plastic casting material.

The specimen was cured and then sawed into the three pieces, and the cut faces were polished down so as to produce if not a transparent specimen, at least one which is relatively good in transmitted light at seeing how the Air-Maze P-5 media acts through the various layers of the filter.

Q. Will you show the court by reference to this plastic model just what the Air-Maze media P-5 is inside the filter?

The Court: Let us give this an exhibit number. What is the next number?

The Clerk: No. 15. [149]

The Court: 15-A, B and C.

Mr. Leonard S. Lyon: The large piece we will call 15-A, the next largest piece 15-B, and the long one we will call 15-C.

(The specimens referred to were marked Plaintiff's Exhibits Nos. 15-A, 15-B and 15-C for identification.)



(Testimony of Sydney F. Duncan.)

The Witness: Exhibit 15-A, looking at it from the side, shows the characteristic so-called Z pattern of the Air-Maze P-5 media.

Looked at from the long face of Exhibit 15-A, it can be seen that the little tunnels alternate in direction as they go down into the filter, showing that this media was stacked in the fashion of the filter panel.

The Court: The wire is in there?

The Witness: The wire is in there. This is the screen still left in place.

The thin piece, which I think is identified as 15-C, is thin enough so that when held against the light and looked through one can see the multiple subdivisions of the panel in both dimensions. The screens contact each other and subdivide the panel in both dimensions.

This thicker section, which is identified as 15-B, is near the center of the media and shows again the multiple subdivision of the panel as we look through the plastic mounted specimen. [150]

The Court: This was a clean specimen, was it?

The Witness: The wire?

The Court: Yes.

The Witness: Yes. There was no dirt on this specimen. There is a little oxidation here and there, but no dirt.

By Mr. Leonard S. Lyon:

Q. Now will you refer to the printed matter on the second page of Exhibit 4, and first I will read to you the paragraph commencing at the bottom of the first column:

(Testimony of Sydney F. Duncan.)

“Because of its remarkable efficiency at high velocity, its low static pressure drop and large dirt-holding capacity, the Air-Maze P-5 filter is particularly adapted to installations where no space exists for plenum chambers in front of coils, or where ‘V’ or ‘U’ type filter banks are not practical.”

Now what is referred to here as you understand this statement by “its remarkable efficiency at high velocity”?

A. This must refer to the test results shown on Exhibit 13 wherein there is an efficiency curve at 1200 CFM for a filter of this type.

Q. Next the text refers to “its low static pressure drop.” Have you pointed out what that refers to in connection with Exhibit 13?

A. In Exhibit 13 the lower curve shows that the static [151] pressure drop is just about 1/10 of an inch of water through at least half the life of the filter, and that is generally considered low for 1200 CFM.

Q. The sentence then continues by referring to “large dirt-holding capacity.” Has that been indicated in the test, and if so, where?

A. The dirt-holding capacity was mentioned before on the basis of trying to define what is dirt-holding capacity. I believe I pointed out that there is no codified standard of what is dirt-holding capacity, but that the filter is expected to be cleaned when its efficiency drops to 85/100 of the initial value.

On the test which I made on the Air-Maze P-5, this dirt-holding capacity was reached at approxi-

(Testimony of Sydney F. Duncan.)

mately 970 or 980 grams of dust on the filter, which is a pretty good dirt-holding capacity.

Q. In the paragraph immediately above the following appears:

“More than a million tiny openings in every 20 x 20 panel literally ‘scrub’ the air free from dust, dirt, and impurities, causing them to deposit evenly on viscous-coated wire baffles. At the same time the ‘Z’ shaped channels (see illustration at right) provide large areas for dirt storage so that flow of cleaned air is almost [152] unimpeded. As a result, the P-5 handles more air, with less servicing than ordinary types of filters.”

Now will you state whether or not your tests have confirmed these statements and wherein you have referred to those tests and also call attention to the illustration at the right of the statement.

A. One thing I must say, and that is I do not know what filter or filters the writer of this paragraph had in mind when he said “ordinary types of filters.” If he was referring to something similar to the old model of Air-Maze filter, made according to the Green patent, then his statements are true as shown by my test results in Exhibits 11 and 13.

Q. Now referring to the uppermost of the two illustrations, in the lower right-hand corner of page 2 of Exhibit 4, the legend reads, “Air enters crimpers layers of galvanized wire mesh at 180 degrees. ‘Z’ shaped channels provide large areas for dirt storage with minimum impedance to air flow.”

Will you compare that with the teachings—

(Testimony of Sydney F. Duncan.)

The Court: What about 180 degrees? I do not see anything about 180 degrees.

The Witness: I believe it does, Your Honor. That is the figures "180" with the little zero above it which means 180 degrees.

The Court: Where are you reading from? [153]

The Witness: The caption at the right, or rather at the left of the upper picture.

The Court: I see.

Mr. Leonard S. Lyon: I will start the question over again.

Q. Will you compare the statements contained in that legend with the teachings of the Farr patent in suit?

A. In the legend it says that air enters crimped layers of galvanized wire mesh. In the Farr patent this same condition is described where air enters crimped layers of wire mesh. I don't believe there is any specification of galvanizing necessary in the Farr patent.

In the Farr patent there are no Z shaped channels but there are channels or passages with a change in direction of approximately the same degree as are shown in the media of the P-5 filter.

The statement in the caption that the channels provide large areas for dirt storage might be a little confusing in the light of the photographs shown in Exhibit 14-A to G where it is shown quite clearly that the dirt storage is on the wires and not as you would shovel dirt into a trough which might be construed to be the channel.

With minimum impedance to airflow, that state-

(Testimony of Sydney F. Duncan.)

ment is apparently clear enough. As a result of having passages through the filter with changes in direction and having [154] provided a construction that is able to actually store dirt on the surface of those passages, the passages are left open so there is a reduced impedance to airflow compared to many other styles of filters.

By Mr. Leonard S. Lyon:

Q. Mr. Duncan, do you find any essential difference in the construction of the filter medium in the P-5 Air-Maze filter and the Farr filter of the patent in suit?      A. I see no essential difference.

Q. Do you see any substantial difference in the method of operation of the two filter media?

A. No, I do not.

Q. Do you see any substantial difference in the results obtained by those two filter media?

A. There is no really significant difference that couldn't be accounted for by slight changes in design.

Q. What do you mean by that?

A. For instance, there is no requirement that either the Air-Maze or the Farr filter be made out of any particular wire size. It might be 14 mesh or 16 mesh or 18 mesh. There isn't any requirement that either one of the filters be packed three layers to the inch or four layers to the inch or five layers to the inch, and these factors of wire mesh size and numbers of layers to the inch will affect the pressure drop characteristic and the efficiency characteristic [155] of the filters.

(Testimony of Sydney F. Duncan.)

Q. Assume that the two filter panels are made on a comparable basis as far as all of those factors are concerned, will you state whether or not, according to your findings, the two filter media obtain substantially the same result?

A. They do obtain substantially the same results as are shown by the very similar shape of the pressure drop in the efficiency characteristic curves on Exhibit 13.

Mr. Leonard S. Lyon: At this time I will offer in evidence the folder of the Air-Maze Corporation for its P-5 type air filter panel as Exhibit 4.

The Court: Admitted.

(The folder referred to was received in evidence and marked Plaintiff's Exhibit No. 4.)

Mr. Leonard S. Lyon: At this time I will offer in evidence the specimen of the P-5 Air-Maze filter medium as Exhibit 6.

The Court: Admitted.

(The folder referred to was received in evidence and marked Plaintiff's Exhibit No. 6.)

Mr. Leonard S. Lyon: You may cross-examine.

(Conference between counsel.)

Mr. Leonard S. Lyon: First, I may have overlooked offering Exhibits 14 and 15. I would like to offer them under [156] their respective numbers.

The Court: Admitted.

(The photographs referred to were received in evidence and marked Plaintiff's Exhibits Nos. 14 and 15.)

(Testimony of Sydney F. Duncan.)

Mr. Harris: I don't find that Exhibits 7 or 8 have been offered.

Mr. Leonard S. Lyon: I think they have, but out of an abundance of caution I will ask that they be received in evidence.

The Court: 7 was admitted, I think, but 8 was not. In any event, they are now admitted in evidence.

Cross-Examination

By Mr. Harris:

Q. Mr. Duncan, how many different types of panel filters have you tested?

A. Why I suppose a dozen or so at various times in the past.

Q. Will you enumerate by manufacture's name and by type number the ones that you have tested?

A. Most of my test work has been on Farr manufactured filters. We have tested, as I said, the Air-Maze Type B. Since my experience with the test work extends over a considerable period of time other than the last two months I don't remember just all of the types. We tested a couple of types of the American Air Filter Company, but I don't remember the [157] precise type designations.

Q. Will you describe them generally for us, each of the other types that you have tested other than Air-Maze and Farr filters?

A. The American Air Filter was one of the type wherein a punched sheet forms the surface layer and various layers of screen and perhaps knitted or metal formed a layer in the filter.

(Testimony of Sydney F. Duncan.)

Another type of American filter which I don't believe carries a type number, omits the punched sheet at the front and uses several gradations of screen and the material known as Brillo, or a kind of knitted metal strip.

Mr. Leonard S. Lyon: May I ask if your question is limited to commercial filters or intended to include experimental models of other types which the witness himself may have made?

Mr. Harris: My question is limited to, first of all, excluding Air-Maze and Farr filters, and is limited to commercial panel type filters made by other manufacturers.

Now we have two American Air Filter Company filters. What others have you tested?

A. I have tested a filter made out of paper, the Detroit Air Filter Company.

Q. That is a commercial model that carries the patent number of the Kaiser patent, produced as prior art here?

A. I didn't examine the patent number on it.

Q. What other commercial panel type filters have you tested?

A. Well, we had a Burgess filter on test at one time but that one was not necessarily a panel type.

Q. Any others?

A. I think that about completes the list.

Q. Now were these tests that you have referred to, first the Detroit Air Filter and, second, the American Air Filter Company's filters, were those tests conducted in exactly the same fashion as the



(Testimony of Sydney F. Duncan.)

tests of the Farr and Air-Maze filters to which you testified on direct examination?

A. The American Air Filter, no, because it was tested some time ago and the test set was not constructed exactly the same way as it is now.

The Detroit Air Filter was tested in the test set in its present condition.

Q. So as to the American Air Filter Company's filters that you have tested, the results which you obtained earlier with the earlier test set could not be compared directly with any of the tests that you have made upon the present test set then, could they?

A. No, the results would be different if we re-ran the tests at the present time.

The Court: What was that answer?

The Witness: The result would be different if we [159] re-ran the tests at the present time.

The Court: With this machine?

The Witness: With this machine and this dust and automatic controls that we have, and so on.

The Court: When did you develop the machine? When was it finished?

The Witness: It was finished I think about a year ago or more, and then it was moved from one plant to another, so it was put again in operation the latter part of June in this new location.

By Mr. Harris:

Q. Is that this test setup that is illustrated in Plaintiff's Exhibit 8 of origin as recent as about a year ago?           A. Yes.

(Testimony of Sydney F. Duncan.)

Q. By the way, when was Exhibit 8 printed, Mr. Duncan?      A. Just recently.

The Court: The date is in the back.

The Witness: Within the last month.

The Court: It is on the last page.

Mr. Harris: 11-15-51 is noted on the last page.

Q. Is that correct?

A. That is the approximate date. [160]

\* \* \* \* \*

Q. Now with regard to the photographs, Plaintiff's Exhibit 9, would you point out on those photographs or any of them these drops of oil that you have referred to on your direct examination?

A. I think perhaps the ones most clearly visible are on 9-B, in the upper part of the filter. There are a few squares of screen where the crimped screen underneath touches the flat screen where there is a little reservoir of oil. I can point them out to you with the tip of my pencil, there (indicating), and there (indicating). There is one in here (indicating), and there are a few others scattered around. [162]

By Mr. Harris:

Q. There are number of those interstices in the wire mesh which are filled with oil, which are shown in that photograph, are there not?

A. At points where the crimped screen touches the fiat screen.

Q. Does that occur also in the Farr filter made in accordance with the '479 patent in suit, that the oil in some cases fills the perforations of the wire mesh?

(Testimony of Sydney F. Duncan.)

A. Not under normal operating conditions.

Q. Now, I think with regard to the photographs, Plaintiff's Exhibit 9, you stated that the air flow is from the bottom to the top of those photographs, is that correct, or that the air flow was from bottom to the top?        A. Yes.

Q. In the tests that you performed?

A. Yes.

Q. Now, it is true, is it not, that as so tested the construction illustrated in these photographs has a short leg of the herringbone passage on the upstream side and a long leg on the downstream side?

A. There is no attempt to make either leg longer or shorter than the other, as can be seen from an examination of the media, Exhibit No. 3. If they look different in the photograph, it is an accident of lighting or something else, [163] but the media was not—no attempt to make the two legs of the crimp different lengths.

Q. Well, regardless of the attempt, what is the fact, were they of different lengths or were they of the same length?

A. They were of the same length, as nearly as we can make them.

Q. Now, in the patent shown, the '479 patent in suit, it, however, shows crimps in which the legs of the herringbone are of different lengths, does it not?        A. In Fig. 3 they are so drawn.

Q. And they are so described in the specification, are they not?

(Testimony of Sydney F. Duncan.)

A. I believe they are. I can't point to the line, however.

Q. So that this sample filter which you tested for the purpose of these comparative tests illustrated by Plaintiff's Exhibit No. 9 was not made in accordance with the drawings of the patent, was it, or the specification?

A. My answer to that depends on my interpretation of the specifications, does it not?

Q. Well, you have just said—

A. I believe that it was drawn, that it is manufactured in accordance with the teachings of the '479 patent.

Q. It did not, however, have different length legs in [164] the corrugations, did it?

A. That is right.

Q. Now, that filter panel which was used in making the tests illustrated by the photographs, Plaintiff's Exhibit 9, was not a commercial sample of the Farr filter, was it?

A. It was made out of the same media and could have been used where the application was required. If you mean commercial sample, the frame was not precisely as we would make a seven-by-seven filter for someone who wanted a seven-by-seven filter.

Q. It was made specifically for the purpose of those tests?      A. That is right.

Q. And that, solely?      A. What?

Q. And solely for that purpose?      A. Yes.

The Court: And precisely the same as your commercial, insofar as the screen is concerned?

The Witness: Yes, sir.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Now, you stated, I think, in testing the small filter shown in Plaintiff's Exhibit 9, that heavier concentrations of dust were employed. Did I understand you to say that they were heavier than normal concentrations that would be [165] used in making filter panel tests?

A. Yes, that is right. We were feeding 10 grams of dust to this small-sized filter in, oh, 25, 35 minutes at a face velocity of the usual 519 feet per minute. We have had some experience in using the little test set versus the large test set and have found that the two tests produce almost the same efficiency characteristics. We used the small test set for an accelerated test, or, as I explained before, a high dust concentration test, to check the characteristics of our adhesive.

\* \* \* \* \*

Q. Now, with regard to the photographs, Plaintiff's Exhibit 9, is it true that some of those photographs—and I point out particularly Exhibit 9-F, which shows the enlargement of the flat screen with the deposition of dust thereon, in fact shows a very substantial accumulation of dust on the flat screen portion of the Farr type filter? A. Yes.

Q. In commercial practice, what percentage, roughly, of the total dust collected would be deposited upon the flat screen portions as compared with the rest of the panel?

A. Well, I haven't attempted to measure it and I would just have to guess.

(Testimony of Sydney F. Duncan.)

Q. As much as 30 per cent?

A. Well, I am not sure that it would be that high.

Q. You don't know that it wouldn't be that high, do you?

A. No. I don't know that it wouldn't be that high.

Q. I show you Plaintiff's Exhibit No. 11, Mr. Duncan. (Handing exhibit to witness.)

In the tests which you made and which are accumulated in this Exhibit No. 11, the fact was that the concentration of dust in the air passed through the Air-Maze Type B filter panel was very substantially higher than the concentration of dust in the air passed through the Farr filter panel, was it not?

A. That is right. The rate of the feed per hour was held constant and the amount of air was different, so that the concentration of dust fed to the Air-Maze was about a half again, doesn't it figure out? We have—well, I won't volunteer anything.

Q. Well, why did you not use the same concentration of dust in testing both panels. [167]

A. Because we have found over many, many tests, at various concentrations, particularly in comparison with the high concentration used in our small test duct and the somewhat lower concentration in the large test duct, that it has very small effect on efficiency provided we use a proper adhesive. The one we used on these tests was one which very rapidly soaks into the dust, so that the

(Testimony of Sydney F. Duncan.)

filter doesn't present a dry surface even though the dust concentration in the air is varied over limits of roughly two to one.

Q. What would have been the effect in general had you used the same dust concentration in testing both of these panels?

A. The curves would have come out to be almost exactly as shown on Exhibit 11.

Q. Now, this Exhibit 11 shows dust load on the filter in grams ranging from zero to 1,000. A 500-gram load on a filter panel of this type is considered a relatively high load, is it not?

A. 500 or 600 grams is usually considered to be a good, solid load.

The Court: Grams per what?

The Witness: Grams per 20-by-20 panel, grams per filter of this size, Exhibit 2.

The Court: You mean the grams that collect in the filter? [168]

The Witness: The grams that stick in the filter, yes, sir.

The Court: All right.

By Mr. Harris:

Q. And you know it to be a fact, do you not, that the usual recommendation of manufacture of filters of the panel type is that they should be cleaned when there is approximately a 500- or a 600-gram dust deposit in the filter?

A. Well, manufacturers have certain recommendations, I know.

(Testimony of Sydney F. Duncan.)

Q. What is the Farr Company's recommendation on that, on cleaning air filters?

A. At around 600 grams.

Q. And do you know what the recommendation of the Air-Maze Company is on the filter, upon the cleaning situation there, how often they should be cleaned?

A. No, I don't believe I do.

Q. So that if you look at this curve, Plaintiff's Exhibit 11, with a dust load of 500 grams, you would have almost exactly the same performance up to that point?

A. They would be pretty close.

Q. With the two filters tested?

A. Yes, their pressure drop and efficiency would be about the same. Their air-handling capacity would be different. [169]

Q. Also referring to Plaintiff's Exhibit 11, these curves, that shows a point on the test, so far as the Air-Maze Type B panel is concerned, of about .5 inch of water, that is correct, is it not?

A. Yes.

Q. And up to .5 inch of water is a satisfactory commercial pressure drop performance for a filter of this type, is it not?

A. The reason this test was stopped—well, no. I better answer your question directly.

So far as I know, a half-inch of water pressure drop doesn't seriously interfere with a ventilating system.

Q. In other words, what you mean by that is that in some conditions of installation, a half-inch of pressure drop would be perfectly satisfactory?



(Testimony of Sydney F. Duncan.)

A. Yes.

Q. In fact, in most?

A. Probably, yes, I think so.

Q. Now, if an operator or user wanted a high efficiency in dust removal and did not care about pressure drop through a filter panel, a filter panel such as the Air-Maze Type B would be preferable to him than the Farr filter panel, would it not?

A. Well, I don't know.

Q. What do you mean by that? [170]

A. To me it would not, perhaps because of its lower air-handling capacity. So that I find it difficult to project my thinking into someone's else's head as to what they might prefer.

Q. That might be the fact, however, might it not? A. He might arrive at that conclusion.

Q. You stated on direct examination that the Farr filter has about 50 per cent more capacity than the old Air-Maze, Plaintiff's Exhibit 5. Did you mean by that air flow capacity or dust-loading capacity? A. Air flow capacity.

The Court: The dust load capacity, I understood you to say, was about the same?

The Witness: The dust load capacity—in the old Air-Maze versus Farr filter, the dust-holding capacity of the Farr filter is somewhat greater, if you take some arbitrary point at which you determine what is dust-holding capacity.

By Mr. Harris:

Q. When you referred to increased filter capacity in the Farr filter relative to the old Air-Maze,

(Testimony of Sydney F. Duncan.)

Plaintiff's Exhibit 5, filter, you were referring again there to air-handling capacity?

A. Air-handling capacity, air flow capacity, the 800 versus the 1200 CFM. [171]

\* \* \* \* \*

Q. Well, perhaps we can get the record in the morning and read it back.

Now in regard to the old Air-Maze filter panel, Plaintiff's Exhibit 5, which has on the front face of it the expanded metal—excuse me. I guess you were referring to Exhibit 12, which has on it the expanded metal screening of the front and back.

A. Yes. If I spoke of expanded metal it was with respect to Exhibit 12, not Exhibit 5.

Q. You know as a fact, do you not, that actually under service conditions that expanded metal does collect a very substantial amount of dust?

A. Well, I haven't tested that particular expanded metal on that particular filter so how substantial the amount is I can't exactly testify. I know that it will collect dust.

Q. You haven't seen filters of that exact type after being tested, is that correct?

A. No. As a matter of fact, the filter I tested—if I may say so—did not have the expanded metal on the face of it because we tested our filter without any expanded metal on the face of it.

The Court: Did you put expanded metal on the face of yours?

The Witness: Yes, we put a material called Shelfex, [173] which is like the expanded metal on

(Testimony of Sydney F. Duncan.)

that, perhaps a little heavier. It has a little bigger hole and it is rolled out flat instead of being left with a little rough feeling, and we put that on the face of our filters for some applications.

By Mr. Harris:

Q. Have you ever tested any Farr filters made in accordance with the '479 patent in suit which did not have flat sheets between alternate layers of crimped sheets?

A. We had a partial test of such a filter without the flat sheets.

Q. How did you hold the sheets apart in that test?

A. We just turned the crimps around so that one sheet was crimped east and the other one crimped west, so to speak.

Q. As in the Air-Maze construction?

A. The same principle; yes.

Q. Referring back again to the tests which are accumulated in this Plaintiff's Exhibit 11, or rather the curves shown on it, what type oil did you use on those particular filters at the time they were tested?

A. It is an oil called Greenbloom 100. It is rather a heavy oil. It is a manufacturer's oil sold by the Standard Oil Company I think to manufacturers who can put their own additives in and market it under their own name.

Q. What is the approximate viscosity of that oil? A. It is 100 seconds Saybolt. [174]

Q. Can you give me the approximate S.A.E. rating? A. No, I don't think I can.

(Testimony of Sydney F. Duncan.)

Q. How about the tests that you made which accumulated in Plaintiff's Exhibit 13, what type of oil did you use in those tests?

A. Greenbloom 100.

The Court: The same oil?

The Witness: The same oil.

The Court: Is that what you use commercially?

The Witness: Yes, it is.

The Court: What is it, a very light oil?

The Witness: No, it is a rather heavy oil. It has a high flash point to meet fire specifications.

By Mr. Harris:

Q. Would it be more viscous than S.A.E. 30?

A. Yes, it is.

Q. Mr. Duncan, in the passage of air through a filter panel such as the Farr or Air-Maze 20-inch panel that is here in evidence, how does the pressure drop vary with the velocity of the airflow?

A. It varies approximately in the same fashion as the pressure drop varies through any orifice at various velocities.

Roughly, the rule is that the pressure drop goes up about the square of the velocity. If you double the [175] velocity the pressure drops about four times as much.

The Court: The pressure drops?

The Witness: Yes.

The Court: If you double the velocity——

The Witness: The pressure drop increases faster than the velocity by approximately the square of the velocity.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Referring to the photographs included in Exhibit 14, and particularly with regard to the photographs marked 14-A through 14-E, you said I think that you took each one of those in sequence and gave the filter panel a dust load, a run, as you call it, for a certain period of dust loading, and then took it out, separated it, and examined the wire mesh of the unit. Did you after each one of the runs separate the panel at the same place?

A. At the same place, as was done with the Farr filter in the same frame.

Q. That would disturb the dust deposit somewhat, would it not?

A. It would disturb the dust deposit somewhat at the places where the two layers of screen touch each other.

Q. Now referring to the photograph which is Exhibit 14-C, and particularly to the upstream side of the filter panel, the upstream face and the upstream end of the corrugations, that shows, does it not, 14-C, that the mesh of the [176] wire is not filled up with dust, it isn't plugged in that photograph, is it?

A. No. I don't see any holes that are plugged up tight.

Q. And the same thing is true as to the photograph 14-D, isn't it?

A. At the upstream face?

(Testimony of Sydney F. Duncan.)

Q. Yes.

A. As I examined the filters after each one of these runs myself I noticed that there were some of the holes that were plugged up, but they don't show particularly well in this picture.

Q. Most of them were not plugged?

A. I can't prove it by the picture.

Q. Most of them were not plugged, however?

A. That is right.

Q. So that at least through those first two runs illustrated by Exhibits 14-C and D——

A. May I correct you? That encompasses four.

Q. The first four runs?                      A. Yes.

Q. There was little or no tendency for the air to be confined to any passages by a deposit of dust. In other words, the way was still open for the air to flow through the mesh of the screens? [177]

A. In a limited fashion; yes. [178]

\* \* \* \* \*

Mr. Harris: If the Court please, I have produced a sample of what purports to be an air filter labeled "Detroit Air Filter," which I ask be marked for identification as Defendants' Exhibit C.

The Court: Very well.

(The sample referred to was marked Defendants' Exhibit C for identification.)

Sydney F. Duncan, the witness on the stand at the time of adjournment, resumed the stand and testified further as follows:

(Testimony of Sydney F. Duncan.)

Cross-Examination (Continued)

By Mr. Harris:

Q. Mr. Duncan, I show you Defendants' Exhibit C for identification and ask you if that is a sample of the type of Detroit Air Filter which you testified yesterday that you had previously tested.

A. (Examining exhibit) It is the same type of filter.

Q. Perhaps not the same size?

A. No, nor is the spacing of the flat paper strips on both sides the same as the one I tested. [182]

The Court: Let me see it.

(The exhibit referred to was passed to the Court.)

By Mr. Harris:

Q. You know it to be a fact, do you not, that filters of that type as shown by Defendants' Exhibit C for identification have been in commercial use and on sale since at least 1932?

A. I have seen reference to them for a long time. I don't know whether it is '32 or not.

Q. Prior to 1937 at any rate? A. Yes.

Q. And it is a fact, is it not, that filters of that type are still widely sold and used commercially in the United States?

A. They are sold, as far as I know. How wide their distribution is, I don't know.

Q. Those filters are made in 20 by 20 panels, are they not? A. Yes.

(Testimony of Sydney F. Duncan.)

A. As well as smaller sizes. A. Yes. [183]

\* \* \* \* \*

Q. Are these filters of the type illustrated by Defendants' Exhibit C used under the same circumstances, the same conditions, as the Farr '479 patent filters that you have referred to?

A. If I understand you correctly, filters made by the Detroit Air Filter Company are applied in ventilating systems where Farr filters are also applied, and since they are made in approximately the same exterior dimensions they could be installed in the same hole in a frame.

Q. These filters as per Defendants' Exhibit C for identification are what we call in the industry "throw away" types, are they not? A. Yes.

Q. In other words, when an operator finds that his filter as per Exhibit C is clogged with dust he simply throws it away instead of cleaning, as is the case with the Farr filters?

A. Yes, they don't bother to clean them.

Q. First of all, as to Defendants' Exhibit C, that type of filter includes alternate crimped and uncrimped layers, does it not, or sheets?

A. Layers of paper; yes. [184]

Q. And those layers extend in the general direction of the flow of air through the filter, do they not? A. Yes. [185]

\* \* \* \* \*

By Mr. Harris:

Q. Would you explain the construction of Defendants' Exhibit C so far as the alternate layers are concerned, Mr. Duncan?



(Testimony of Sydney F. Duncan.)

A. It is a little difficult to see the construction in this particular sample because it is impossible to look through the edge of the paper around the outside. [186]

Mr. Leonard S. Lyon: I think the witness may have a model here that he can use in answer to the last question.

The Court: Do you?

The Witness: If I may produce one.

The Court: Yes, surely.

I see you have one of those "patented devices" here?

Mr. Harris: This is just a penknife; I am going to cut it so we can see what is inside.

The Witness: That is all right. I have one that is all cut up.

The Court: That will be marked No. 16.

(The device referred to was later marked Plaintiff's Exhibit No. 16 for identification.)

Mr. Harris: I don't seem to be able to cut this one either.

The Witness: With the two of them together, I think I can explain the matter.

Mr. Harris: For the record, I am going to cut, or attempt to cut, a hole in the top of Defendants' Exhibit C so we can find out what is inside of it.

The Court: Well, this Exhibit 16 has one size opening on one side and another size opening on the other, apparently.

The Witness: This was, however, an example of

(Testimony of Sydney F. Duncan.)

a standard Detroit air filter that is commercially produced at the present time. [187]

The Court: You secured that?

The Witness: Yes.

The Court: In the open market?

The Witness: In the open market.

By Mr. Harris:

Q. I have now cut two holes, a large one and a small one, in the sides of Defendants' Exhibit C. I show the witness again this exhibit. Directing your attention to the large hole at the edge, perhaps you can use that to point out to the Court what the construction of that is.

A. Defendants' Exhibit C is a filter made of paper in which there are two separate units assembled in one frame.

The units form the front and back faces of the filter. Each separate unit is made of alternate corrugated or crimped layers of paper and flat layers of paper, stuck together with an adhesive and stiffened by having small strips of wood placed along the back of the filter. These strips of wood are seen in Defendants' Exhibit C and Plaintiff's Exhibit No. 16 where the frame is cut away.

It is the function of these strips of wood to stiffen the panel and to a certain extent separate the two panels.

The Court: This one is different in size.

The Witness: Well, the difference between the two exhibits is that Exhibit C was manufactured in its present size by the Detroit Air Filter;

(Testimony of Sydney F. Duncan.)

whereas, Exhibit 16 is a [188] section cut out of a 20 by 20 panel and assembled this way for purposes of demonstration.

By Mr. Harris:

A. And in the model, Defendants' Exhibit C, do the alternate crimped and uncrimped layers extend in a direction generally parallel to the stream of air flow through the filter?

A. Yes, they do. [189]

\* \* \* \* \*

Q. If Defendants' Exhibit C, made with the alternate crimped and uncrimped cardboard layers, were made out of screen wire instead of cardboard, would such a filter work in substantially the same way to produce the same result? By that I mean removal of dust from air passing through it, as the filter panel shown and described in the '479 patent in suit.

Mr. Leonard S. Lyon: The same objection.

The Court: Objection overruled.

Do you understand the question?

The Witness: I believe so.

The Court: All right.

The Witness: A two-unit device with stiffeners down the back, in every way the same as the Detroit air filter, but [190] with the simple substitution of screen for paper, would act as an air filter. Now, then, that is neither physically like nor the same as the Farr filter. There are two units in this frame, and there are not two units in the Farr filter, as shown by Plaintiff's Exhibit No. 3. But

(Testimony of Sydney F. Duncan.)

it certainly would act as an air filter if it were made of screen and oiled.

The Court: How would the efficiency rating and pressure loss compare?

The Witness: I don't know, Your Honor.

The Court: How does this (indicating) compare? Have you tested this for pressure loss and efficiency rating?

The Witness: I tested one that is not exactly like Exhibit C, because Exhibit C has rather large crimps on both sides, whereas Exhibit 16 has I think three layers to the inch on one side of the filter and five layers to the inch on the other side.

The Court: You have tested this one?

The Witness: This one has been tested, yes.

The Court: Or you didn't want to ask him that question?

Mr. Harris: Oh, I don't care. I would just as soon ask him.

Q. As a matter of fact, in that Detroit air filter that you tested you found that there was a very low pressure drop during the period of test, did you not?

A. I have to refresh my memory and look at the curve. [191]

In the test I ran on a Detroit filter in a 20 by 20 panel, at 519 feet per minute, or 1200 CFM, through the 20 x 20 panel, the pressure drop was varied from 23/100 of an inch to approximately 28/100 of an inch over a dust collection by the filter of some 250 grams. The efficiency of the filter over

(Testimony of Sydney F. Duncan.)

the same series of test runs varied from approximately 65 per cent up to about 73 per cent. This filter was tested in the large test set described previously, with the conditions of dust feed, air velocity and temperature, and so on, the same as for the tests shown on Plaintiff's Exhibit No. 13. [192]

The Court: And used the same material?

The Witness: The same dust.

The Court: The same dust.

The Witness: The difference—I think I said that all of the other filters were tested with this Greenbloom 100 oil. The Detroit filter paper comes already provided with its adhesive so the adhesive is the one thing that is different in the test. It has its own adhesive on it.

By Mr. Harris:

Q. And the higher initial pressure drop for the Detroit air filter in that test was higher than the Farr filter?      A. Over twice as high.

Q. And that higher starting pressure drop was due to the fact that in the Detroit air filter the air could not flow through the walls of the alternate crimped and uncrimped layers?

A. That probably contributed to it.

The Court: What is the difference between Pocahontas fly ash, 80 per cent and 20 per cent lampblack? What is the difference between that and the dust you used?

The Witness: Quite a lot. I believe you are looking——

(Testimony of Sydney F. Duncan.)

The Court: At Exhibit No. 4.

The Witness: The P-5 catalog.

The Court: Where they say their filters were tested [193] with this combination.

The Witness: There is no particle size analysis given of this dust. I believe the specification is that it shall pass a 100-mesh sieve, which doesn't give me enough information to tell exactly what the difference is between this dust and the dust we are using.

The Court: Very well.

By Mr. Harris:

Q. There is another very common dust which is used for testing purposes which is indorsed by the Bureau of Standards, is there not?

A. Yes. They use a material they call Cotrell Precipitate.

Q. And that is 96 per cent Cotrell Precipitate and about 4 per cent lint, isn't it?

A. I don't think they use the lint at all. Sometimes they do and sometimes they don't.

Q. Have you made any tests of the Farr '479 type filter using a dust including lint?

A. Not recently in the presently designed test set.

Q. The fact is, however, that if you use such a dust, including a fair supply of lint, that the pressure drop will rise much higher than you have indicated by your curves in evidence, Exhibits 11 and 13?      A. Not necessarily. [194]

Q. Two or three times as high, wouldn't it?

(Testimony of Sydney F. Duncan.)

A. As I said, I haven't tested it recently. Just my opinion is that it will not increase the pressure drop seriously unless you have—well, for instance, if you throw a pillow full of feathers at it why the pressure drop will probably go up to whatever the fan can do. It will close off the whole thing. A pillow full of feathers won't do anybody's filter any good.

On the other hand, if there is a small amount of lint in the air, we have found that it doesn't seriously change our pressure drop characteristic curve.

Q. What do you mean by "a small amount"? Do you mean in the air used under service conditions or in your tests in your laboratory, which do you mean?

A. Well, since I haven't tested with lint I am relying now on observations of filters operating in linty areas.

For instance, I seem to remember that we had a filter installation intake on one side of an alley opposite the exhaust from a hat works, or something, on the other side of the alley, where it just happened that a lot of lint from reconditioning hats, men's hats, came across and deposited on the filter.

We found the operation of that filter to be quite satisfactory if it were cleaned a little oftener of the lint matter that formed on the face of it. The lint could be cleaned off [195] of the filter quite easily.

Q. You mean in that filter the pressure drop through the filter increased more rapidly than it did under perhaps other service conditions?

(Testimony of Sydney F. Duncan.)

A. Yes, that is true.

Q. And increased to a great extent, did it not?

A. It would be true of any filter operating under lint conditions, in my opinion.

Q. The fact of the matter is, in the Los Angeles area there is considerable lint in the atmosphere around outside?

\* \* \* \* \*

The Witness: There is some lint in the atmosphere. It varies from area to area depending upon activity. I don't know precisely how much. [196]

By Mr. Harris:

Q. And there was no lint in the dust that you used in making the tests accumulated in Plaintiff's Exhibits 11 and 13, was there?

A. No, there was no lint in the dust.

Q. Referring you to the Farr catalog, which is Plaintiff's Exhibit 7, that catalog shows—you have one, have you? A. Yes.

Q. That catalog shows a number of what appear to be different types of filter units—and I refer you to the back page of the catalog—are those units all made in accordance with the teachings and disclosures of the '479 patent in suit?

A. You are talking about the filters on the back page?

Q. Yes. A. The back of the catalog?

Q. Yes.

A. Well, one of these units is not a filter unit. It is a washing apparatus.

Q. Which one is that, Mr. Duncan?



(Testimony of Sydney F. Duncan.)

A. That is the second picture from the top on the right-hand side.

Q. On the left, do you mean, don't you?

A. On the right-hand side of the page, right there. [197] (indicating) It is the second picture from the top, and it is a washing and oiling device, so that that picture hasn't anything to do with the filter. Anybody's filter could get into this thing.

On the left-hand side, the second picture from the top, the caption reads "Far-Air Rotary Coolers," so that device is not designed as an air filter of the panel type.

The other pictures illustrate air filters and they are made of the same media as shown in Plaintiff's Exhibit 3—where is Exhibit 3?

(The exhibit referred to was passed to the witness.)

By Mr. Harris:

Q. All of the other types you would classify as filter panels, would you?

A. Well, there are round panels and rectangular panels. We make that distinction among ourselves at least, but panel type filters to most people means a rectangular panel.

Q. Would you say that a round filter was not a filter panel?

Mr. Leonard S. Lyon: I object to that. He has already answered that.

The Court: A round what?

Mr. Harris: A round panel is not a filter panel.

The Court: What is the difference?

(Testimony of Sydney F. Duncan.)

Mr. Harris: I want to know what this witness means [198] when he says that is a filter panel.

The Witness: I have said round panels and rectangular panels, but that usually when we speak of panel filters people envision the rectangular one rather than the round one, that is all.

By Mr. Harris:

Q. They may be either round or rectangular?

A. I have no objection to their shape.

Mr. Harris: I produce a sample of one of the round Farr filters which counsel has kindly provided to us and ask that it be marked for identification as Defendants' Exhibit D.

(The device referred to was marked Defendants' Exhibit D for identification. )

By Mr. Harris:

Q. Showing you Defendants' Exhibit D for identification, Mr. Duncan, that is a filter of the type illustrated in the lower right-hand corner of the catalog, Plaintiff's Exhibit 7, is it not?

A. Yes.

Q. Now the plaintiff Farr Company also makes filter panels having the same type of media as the rectangular Farr panels in evidence here, which are four inches thick, do they not?      A. Yes.

Q. Do you have any performance curves on the 4-inch-thick [199] Farr panels?

A. No, I don't have any curves with me.

Q. You know as a fact, however, that in the 4-inch-thick panels the pressure drop is considerably higher than in the 2-inch-thick panels?

(Testimony of Sydney F. Duncan.)

A. Just about twice since it is twice as thick.

Q. And the increase in pressure drop is commensurately greater, is it not, between the 4-inch and the 2-inch?

A. The general slope of the curve would be about the same. The percentage increase would be the same for the 4-inch and the 2-inch.

Mr. Harris: I produce a further Farr catalog entitled "Far-Air Filters" and identified as Bulletin B-100-1, which I ask be marked for identification as Defendants' Exhibit E.

(The catalog referred to was marked Defendants' Exhibit E for identification.)

By Mr. Harris:

Q. Showing you Defendants' Exhibit E, Mr. Duncan, do you recognize that as an earlier form of catalog put out by the Farr Company, the plaintiff here, showing their various filter panel products? A. Yes.

Mr. Harris: I think this is helpful, if the Court please, because it shows perhaps a little more clearly than the catalog Exhibit 7 some of the plaintiff's products. [200]

The Court: This bears a printing date 1946 on it. I notice that Exhibit No. 7 has a printing date 9-1-51 on it.

Go ahead.

Mr. Leonard S. Lyon: This last exhibit is Bulletin B-100-1 and I notice the Exhibit 7 is Bulletin B-100-2.

The Court: Yes.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. The products illustrated in this last catalog, Defendants' Exhibit E, have all been made and sold by the Farr Company, have they not?

A. I think so. I don't have the exhibit here, but if we have a picture of it in there we made it once.

Q. On pages 2 and 3 of that catalog, Defendants' Exhibit E, are shown a number of types of filter panels, is that correct?      A. Yes.

Q. And those have all been made by the Farr Company, have they not?      A. Yes.

Q. Now on the back of that catalog is a small illustration in the lower left-hand corner on the left side of the page——

A. Under the wording "progressive loading"?

Q. Yes.

That illustrates the operation of the filter panels made [201] in accordance with the '479 patent in suit, doesn't it?      A. Yes, sir.

Q. Now would you explain with reference to that little illustration what this progressive loading is? I think the illustration is quite clear.

A. The illustration shows four red lines labeled 1, 2, 3 and 4, and captioned "Air Flow."

Line No. 1—well, all of these lines are a little wiggly, but line No. 1 is quite straight and is shown going through the filter in such a manner that it would have to pass through the meshes of the screen of the sheet of crimped screen.

Line No. 2 is shown deflected down one of the passages formed by the sheet of crimped screen and

(Testimony of Sydney F. Duncan.)

the dirt on the side of that passage is indicated by the black, heavy black, area.

Line No. 3 is still further deflected down the passage.

Line No. 4 is deflected down the passage until it comes to the change in direction and then follows the new change in direction until finally it indicates that the air has reached a place where there are unclogged screen meshes and then it flows through the mesh of the screen again.

This action is I think about the same as is shown in Plaintiff's Exhibit 9.

Q. When the filter is cleaned then the general direction [202] of air flowing through the filter is straight through in a plane perpendicular or normal to the face of the filter, is it not?

A. As I have said before, the flow takes place partly down the passages and partly through the mesh of the screen.

There is no aerodynamic principle that requires that the air follow its path alone.

Q. When the filter is clean, how far down the passages does it go before going through the mesh?

A. Some of it may go a little ways, and some of it goes right through a mesh to begin with. I don't know.

The Court: Is there a turbulence created in the air in the filter?

The Witness: Yes, there is turbulence created by the fact that the walls of the passages are, in effect, rough because of the wires that interrupt

(Testimony of Sydney F. Duncan.)

their surface and turbulence is caused by air flowing through the mesh of the screen from one passage to another and interrupting the flow in adjacent passages. This would be an interchange type of flow causing turbulence.

By Mr. Harris:

Q. Referring to the series of photographs included in Plaintiff's Exhibits 9 and 14, which I show you, can you say that those photographs in those two exhibits show that the Air-Maze P-5 filter loads more uniformly throughout its [203] thickness than does the Farr filter of the '479 patent?

A. If photographs 14-D and 9-D are compared, it appears——

The Court: That is after 70?

The Witness: Yes. One is after 40 grams and the other is after 70 grams, but the appearance of the pictures is what I wish to call attention to.

The Court: Which one is after—40 grams, you say?

The Witness: 14-D is labeled after 4 runs, one run with 10 grams in each case.

The Court: Then Exhibit 9-C would be the corresponding picture on the Farr filter, would it not?

The Witness: Yes. I will compare those if you wish.

Comparing No. 14-D and 9-C, it appears that in 14-D a dust has deposited on the upstream face of the filter down through the first section of the so-called Z crimp, is deposited in the center of the section of the Z crimp and in a few places is

(Testimony of Sydney F. Duncan.)

depositing on the downstream or lower face of the filter in 14-D.

This action is not demonstrated in 9-C where the dirt load is toward the upstream face of the filter. By Mr. Harris:

Q. So that the distribution of dirt load is more uniform throughout the depth of the Air-Maze filter than it is in the Farr filter? [204]

A. I would say it is more uniform.

The Court: At that stage.

The Witness: There is a gradation of intensity of dust load, but it is distributed through more of the filter than on the Farr filter.

The Court: Is that true after 9 loading runs, 9-E?

The Witness: Well, if we wish to compare the same amount of dust fed to the filter then 14-E—well, there isn't any exactly corresponding picture to 14-E, which was the last picture taken after 50 grams.

The Court: Is there one that corresponds to 9-E?

The Witness: No, there is none. The test was discontinued after the P-5 media had been loaded pretty well all through the filter as shown in 14-E.

The Court: What is that after 7 runs?

The Witness: In 14-E, that is this one, that is after 5 runs, or 50 grams had been fed to the filter.

The Court: You do not have any corresponding——

(Testimony of Sydney F. Duncan.)

The Witness: I don't have a 50-gram picture of the Farr filter. I have a 40-gram and a 70-gram and a 90-gram picture.

The Court: What is the largest gram picture you have of the P-5 filter?

The Witness: 14-E, 50 grams. And the dust is distributed well through the filter all the way through. [205]

The Court: How does that compare with 9-E?

The Witness: 9-E, after 90 grams the dust is heavily loaded toward the face of the filter and the downstream half of the filter, one might estimate, is perhaps half loaded, or something like that.

The Court: Very well. Proceed. [206]

By Mr. Harris:

Q. Why didn't you make any 70-gram run on the Air-Maze P-5 filter tested?

A. Because of the dust distribution throughout the filter. The pictures had shown——

The Court: You mean the pressure drop?

The Witness: No. This was not a pressure drop proposition.

The Court: All right.

The Witness: It was to show where the dust was in the filter, and a further loading of this filter and taking of photographs would probably not have shown much distinction, although it would have probably caught some more dirt.

By Mr. Harris:

Q. The same reasoning applies as to why you did not make a 90-gram test on the Air-Maze filter tested, does it not?



(Testimony of Sydney F. Duncan.)

A. I thought that was what I was talking about. I must have misunderstood your question.

Q. I asked first as to why you did not make a 70-gram test on the Air-Maze filter, and now I want to know why you did not make a 90.

A. For the same reason.

Q. I note that in these photographs that are the Exhibit 9 photographs, the dust on the Farr filter is very dark in color, whereas in the Exhibit 14 photographs the dust is very [207] light, almost white in color. To what do you attribute that, Mr. Duncan?

A. The difference in lighting. The same dust was used, the same oil was used, they were treated the same, as nearly as we could, prior to running the test. But the dust did look lighter on this filter, on the P-5, than it did on the Farr filter.

Q. On Exhibit 14 I think, just so the record will be clear, you ought to mark with a pen the direction of air flow.

Mr. Leonard S. Lyon: You better have the exhibit itself, or do you have it?

The Court: I think he has it.

The Witness: I have the exhibit. I can do that.  
By Mr. Harris:

Q. I suggest that you simply mark an arrow on that exhibit, perhaps on the margin, to illustrate the direction of flow.

(The witness complies with the request of Mr. Harris.)

(Testimony of Sydney F. Duncan.)

Mr. Harris: And on one of the lower margins of the sheet you have marked an arrow with the words "Air flow," have you not?

The Witness: I have. [208]

\* \* \* \* \*

Q. Referring to Plaintiff's Exhibit No. 7, the Farr catalog, which is before you, and particularly on the back sheet thereof to the unit illustrated in the lower left-hand, entitled, "Far-Air Kitchen Grease Eliminators," that is comprised of two standard Farr air filters set at an angle to each other, is it?      A. Yes.

Q. As also are illustrated in the '479 patent?

A. Yes.

Mr. Leonard S. Lyon: You mean by that the filter media?

Mr. Harris: The filter media is the same as in the '479 [209] patent. They are referred to there in the catalog as "Grease Eliminators."

Q. What is the function of those units, to take grease out of air?

A. To take the droplets of grease that spatter up off of a hotel kitchen range or something of that sort.

Q. Are those droplets in a solid state or are they in a liquid state?

A. They are in a liquid state, I suppose.

Q. Referring to the device illustrated on the back of Plaintiff's Exhibit No. 7 on the right-hand side, second from the bottom, which is identified as a "Far-Air Type EC-2," that is a unit adapted

(Testimony of Sydney F. Duncan.)

to be placed on the carburetor of an internal-combustion engine, is it?

A. I suppose we could use them, but ordinarily we do not. They are for air compressor intakes. We could use them on carburetor intakes on small-size engines.

Q. Mr. Duncan, do you have in front of you copies of the graphs, Exhibits 11 and 13?

A. I have a copy of No. 13 here, but No. 11 seems to have escaped me for the moment.

Q. Very well. I shall hand you the Court copy of No. 11. (Handing Exhibit No. 11 to the witness.)

Did you draw these curves yourself?

A. Yes, sir. [210]

\* \* \* \* \*

The Court: About how long would this Detroit filter last before it would be thrown away? Well, the low pressure drop, I understand that determines the period.

The Witness: I think it is very difficult to answer a question of how long a filter will last.

The Court: Well, how long before it builds up under test conditions?

The Witness: Well, under test conditions, it is an exaggerated situation so we can get it tested within a reasonable period of time. At 20 grams an hour and at a thousand grams we would get 50 hours of testing to produce that curve, divided by, say, approximately 75 per cent, and you have about 75 hours of test to produce that curve.

The Court: Oh, you have the Exhibit 13 now?

(Testimony of Sydney F. Duncan.)

The Witness: Or Exhibit 11.

The Court: I mean, you don't have a curve on this, do you?

The Witness: I read some data, and the time it took to accumulate that data where the pressure rose from about 23/100 of an inch to about 28/100 of an inch. That was 250 or '60 grams, I think I said.

The Court: Yes.

The Witness: So that would be of the order of five hours.

The purpose of that particular test was to determine its initial or starting conditions, and we did not run a load test [215] on it.

The Court: You did not test it to see how long the pressure drop built up to where its efficiency was destroyed?

The Witness: Well, because of the nature of the adhesive on the Detroit air filter, which is rather thick grease material, which you can feel on Exhibit C, the grease doesn't soak through the dust very fast, so that in an accelerated test the filter fails earlier than a filter on which you can put stuff like this Greenbloom 100, which is a very thick oil something like S.A.E. 60 or something like that.

So, with this filter, from an examination of its surface and looking into the passages, its surface was getting dry at the end of this test and we discontinued the test because we had determined the initial conditions.

The Court: In other words, if the surface was

(Testimony of Sydney F. Duncan.)

dry, then the particles would not stick?

The Witness: The efficiency would have shortly started to drop off.

The Court: Well, on that type of filter, they take them out and throw them away because they get dry or because they get filled with dust?

The Witness: Well, with passages as large as they are in Exhibits C and 16, ordinary dust would probably not plug these passages as such, but when the filter is thrown away, it depends on who is using the filter and not on the [216] manufacturer.

The Court: It depends on the use of the filter?

The Witness: It depends upon the feelings of the user. A filter like ours—The Detroit air filter is sold to the individual householder among others, to put in his forced-draft heating system. Now, whether the individual householder throws it away in time or too early or never throws it away depends upon him and not upon the manufacturer.

The Court: What is the comparative cost to the customer of the 20 by 20 Detroit filter and the Farr 20 by 20 or an Air-Maze 20 by 20?

The Witness: It is of the order that is thrown away. Filters of this and several other types run around, I think, \$1.25 or so.

The Court: For a 20 by 20 panel?

The Witness: For a 20 by 20 panel. And they probably should be thrown away about once a heating season and start the heating season with a clean filter.

(Testimony of Sydney F. Duncan.)

On the Farr filter, I am not in the sales department, so I don't know what we sell them for, but it is seven or eight dollars, but they have got it for 10 or 15 years if they treat it well.

This one (indicating) costs a dollar to two dollars a year, and the other one maybe costs 50 cents a year.

By Mr. Harris: [217]

Q. Can't we clarify this, Mr. Duncan, by saying that the user should use any of these filters, whether they are the Farr, the Air-Maze filter P-5 in suit, or the old Model B Air-Maze, or the Detroit air filter, until the dust holding or collecting capacity begins to drop off very fast, at which time the filter of the throw-away type should be thrown away, or if it is a wire type, it should be cleaned? That is the actual fact of the matter, is it not?

A. The user should use the filters until they have either exceeded some pressure drop or dropped below some efficiency. You said "dust-holding capacity" drops off, and we have been referring to efficiency or pressure drop, and dust-holding capacity isn't exactly the statement that I would have used there.

Mr. Harris: I should have said "efficiency."

The Court: Well, a filter is subject to the additional infirmity of drying out and not collecting any dust, regardless of how much dirt is collected in it to reduce the pressure drop?

The Witness: No. The dust dries it out.

The Court: The dust dries it out?

(Testimony of Sydney F. Duncan.)

The Witness: The dust dries it out. This adhesive, so far as I have been able to observe, doesn't seem to just dry out before——

The Court: It dries from the heat of the air?

The Witness: It is pretty sticky stuff, not vaseline. [218]

(Short recess.)

The Court: Proceed.

By Mr. Harris:

Q. Mr. Duncan, Plaintiff's Exhibit 2 is a Farr air filter type 44. It has the 14 mesh wire in it, does it not? A. Yes.

Q. And the Farr Company also makes a similar filter referred to by them as a model 88, does it not?

A. 88? I don't remember an 88. We have a 68.

Q. Well, another model which has 18 mesh wire instead of 14 mesh wire? A. Yes.

Q. And in tests of that model with the 18 mesh wire, the filtering efficiency is higher and the pressure drop is also higher, is it not, than in this 44 model?

A. Yes, a little bit. But it has the same characteristic flat pressure curve, and so on.

Q. Now when these filters, such as the Farr filters, Plaintiff's Exhibit 2, are used in the field the dust concentration in the air passing through the filters is very much less than in the laboratory tests that we use to make the curves, Exhibits 11 and 13. That is true, is it not? A. Yes.

(Testimony of Sydney F. Duncan.)

Q. And the dust accumulation in those filters is over a long period of time before the filter efficiency starts to drop off? I mean a relatively longer period of time. [219]

A. Well, if you mean just handling ordinary atmospheric air.

Q. Yes.

A. There are of course applications where the dust concentrations are higher than in the test set.

The Court: As, for instance?

The Witness: A tobacco processing plant has an application where we have suggested that the filter be cleaned every four hours. They have a very dusty area. I don't know why, but there is one case like that.

Then there are railroads where they draw air from close to the track, and they are cleaned at more frequent intervals.

The Court: This tobacco plant, what do they do, put the dust back in the cigarettes?

The Witness: Well, I didn't inquire into that, but that was just about the kind of stuff we were asked to take out of the air.

By Mr. Harris:

Q. Now in ordinary field service where a filter might run, say, 30 days before having to be cleaned or requiring cleaning, in that case the dust accumulation is slow and that slow accumulation of the dust gives an opportunity for the oil, with which the filter is initially coated, to soak through the dust and present continuously a wet oily surface, [220] does it not?



(Testimony of Sydney F. Duncan.)

A. That is the function of the adhesive.

Q. In other words, in a long period of service like that in the field the oil soaks through the dust as the dust is accumulating and continually presents a fresh oiled or oily surface upon which the dust particles may impinge?

A. That is the intention; yes.

Q. And that is true even in the Detroit air filter which is in evidence, or which is marked for identification as Defendants' Exhibit C, is it not, that the same thing takes place in the field?

The Court: It is in evidence. Exhibit C is in evidence.

The Witness: To a different degree, but it is the same type of action as far as the adhesive is concerned [222]

\* \* \* \* \*

The Court: Is there not any precipitation that they use in smokestacks?

Mr. Leonard S. Lyon: That is electrical precipitation.

The Court: They use electricity in precipitating the dust.

The Witness: They charge the particles and collect them on plates. But they have to be particles, not gases.

The Court: They have to be particles?

The Witness: Yes.

The Court: In other words, that is not used in the ordinary commercial installation?

The Witness: In some of them, yes.

(Testimony of Sydney F. Duncan.)

The Court: I mean, for instance, like these up here in this room, they would not use an electrical filter there to precipitate it, would they?

The Witness: Many of them have been installed in building ventilating systems.

The Court: They have?

The Witness: Yes.

The Court: And do they require cleaning or are they a solid plate or is it a wire plate?

The Witness: Well, it is generally a series of solid plates next to each other and they do have to be cleaned periodically.

The Court: They do not use screen wire? [223]

The Witness: There is one type that has some slightly roughened surface, I think.

By Mr. Harris:

Q. Referring, Mr. Duncan, to Plaintiff's Exhibit 5, which is the Air-Maze type B filter panel, you have testified I think that the downstream side has a number of layers of alternately crimped and uncrimped mesh members, have you not?

A. Yes.

Q. And those members subdivide the edge of the panel in two dimensions, do they not?

A. Yes.

The Court: That is the Air-Maze?

Mr. Harris: This is the Air-Maze type B.

The Witness: Yes, it is the edge of the panel which is normally covered by sheet metal that is subdivided in two dimensions. [224]

\* \* \* \* \*

(Testimony of Sydney F. Duncan.)

Mr. Harris: Before we go into the patent in suit, I produce here a Farr bulletin numbered Bulletin A-100-4, which I ask be marked for identification of Defendants' Exhibit F.

The Court: That is a Farr bulletin?

Mr. Harris: Farr bulletin, your Honor, No. A-100-4.

(The bulletin referred to was marked Defendant's Exhibit F for identification.)

By Mr. Harris:

Q. I show this to the witness——

Mr. Leonard S. Lyon: He has one.

You might hand that to the court and he can use this one.

By Mr. Harris:

Q. Does this bulletin, Defendant's Exhibit F, illustrate various manners in which the Farr filters of the 44 type may be and are installed commercially? A. Yes.

Q. I note on the first page of that little bulletin, the second view about the center of the page from the left, second view from the left, is entitled "V-bank." That is one method of installation in an air duct?

A. Of filters in general, yes. [225]

Q. Of the Farr type filters involved in this suit?

A. Yes, we could install them that way.

Q. And they are installed that way, aren't they?

A. I suppose so. I don't remember seeing one just like this.

(Testimony of Sydney F. Duncan.)

Q. And looking at the back of that bulletin there again are a series of diagrams toward the lower portion of the page, one of which is entitled "Slanted Filter."      A. Yes.

Q. Which shows a filter panel, does it not, which is set at a very acute angle to the axis of the duct?

A. Yes.

Q. In that the normal direction of the air flow would be at an acute angle with relation to the face of the filter panel, would it not?

A. Well, the panel is at an angle to the duct, but the air flow is actually changed considerably by the installation of the filter panel.

The Court: Do you have a copy of that?

(The exhibit referred to was passed to the court.)

By Mr. Harris:

Q. Then also on the back of that little pamphlet, the second view from the right, entitled "Double Slanted Filters," it shows two of these filter panels set at a V-angle in the duct, does it not? [226]

A. It shows two filter panels set that way; yes.

Q. And the Farr filters, to your knowledge, are installed as shown in these two figures to which we have had reference on the back of this pamphlet?

A. We have used the slanted filter in aircraft installations, and I don't know whether we have used the double slanted deal or not, but there is nothing to prevent our using it where it applies.

(Testimony of Sydney F. Duncan.)

Q. Well, now, in either of those forms, either of those applications, first of all the direction of air-flow through the duct is along the length of the duct, is it not?

A. Provided there aren't changes in direction or obstructions or something. [227]

By Mr. Harris:

Q. And what is the direction of air flow relative to the face of the filter panel where the air flow strikes the filter panel?

A. It probably makes some kind of an angle at the face of the filter panel.

Q. It would be at an acute angle, would it not?

A. Not necessarily.

Q. The air would be striking the filter panel face in a very acute angle, would it not?

A. Not necessarily. If there were a single jet of air in an otherwise still body of air, then I would say it could be directed at an acute angle to the face of the filter, but where the filter occupies the entire cross-section of the air flow passage, whether it be at an angle or abnormal to the air flow passage, this changes the flow of air ahead of the filter and after the filter. So you can't say, without going into some rather delicate test procedure, just exactly at what angle the air flow meets with the face of the filter, either a half-inch out from the face of the filter or a quarter-inch out from the face of the filter.

Q. Now, will you refer again to the patent in suit, the '479 patent in suit, which is Plaintiff's Exhibit 1. Now, you have stated, I think, that the

(Testimony of Sydney F. Duncan.)

panel as shown in that patent is subdivided by the crimped and uncrimped [228] sheets in both dimensions. Did you so testify?

A. I think I said that the panel was subdivided in both dimensions to the face of the panel by the crimped sheets. I don't remember my wording exactly, but whether I said the crimped and uncrimped sheets, I think I left out the "flat sheets" in that statement.

Q. Do you say that the filter panel illustrated in the '479 patent is divided in both dimensions by the wire sheets upon the panel bed? A. Yes.

Q. And both the flat and the crimped sheets contribute to that subdivision, do they?

A. Well, the flat sheets cannot contribute to the sub-division in the dimension parallel to the direction in which they run.

Q. What are these dimensions that you are speaking of?

A. The dimensions that I speak of are the usually accepted engineering method of describing a space or an area. We speak of one-dimension flow or one-dimension motion, or a force in one dimension, when we designate a single line and the distance along that line.

We speak of motion in two dimensions where we mean motion that would take place in a plane, a flat surface, and it might go, for instance, up at the same time that it was going to the right or to the left. [229]

(Testimony of Sydney F. Duncan.)

The dimensions are generally understood to be directions at 90 degrees to each other, so that when we speak of three-dimensional motion or space, or a three-dimensional force system—it applies to all of these things—we mean a motion or a space or a force system in which it takes the three axis mutually at right angles to each other to describe a distance or a location or a direction or something.

Q. Boiled down, Mr. Duncan, it is the length and breadth of the face of the filter panel?

A. These two dimensions, while they are understood to be a 90 degrees to each other, I haven't specified any particular orientation to the face of the panel.

Q. So they could be oriented in any direction?

A. They could be. One of them could be one diagonal, and the other another diagonal of the square.

Q. In other words, if we took the '479 patent drawing and held it at a 45-degree angle, the face of the filter panel would still be divided vertically and horizontally?

A. It would be multiply subdivided in both dimensions of the face of the panel, yes.

Q. Now, do you find anything in the specification of the '479 patent that would indicate what such both dimensions are?

The Court: What the dimensions are?

Mr. Harris: Both dimensions that he is talking about. [230]

The Witness: I don't remember any definition

(Testimony of Sydney F. Duncan.)

such as I have just given you about "both dimensions."

The Court: There are only two dimensions there, aren't there?

Mr. Harris: Well, I am trying to find out what these dimensions mean, your Honor. That is going to be a question you will have to decide.

The Court: What "dimensions" mean?

Mr. Harris: Yes.

The Court: What what dimensions mean?

Mr. Harris: Well, the claims specify "both dimensions" and we have to determine what that means.

The Court: All right.

The Witness: Well, it says something about both dimensions perpendicular or in a plane perpendicular to the generally intended direction of air flow or the intended direction of the flow of the medium to be filtered, I think.

Mr. Leonard S. Lyon: You don't have to remember this patent by heart.

The Witness: No.

The Court: It says, "arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered." "Both dimensions."

Have you got the patent there? [231]

The Witness: Yes.

The Court: I was reading claim 4.

The Witness: Yes.

The Court: Is that what you are talking about?



(Testimony of Sydney F. Duncan.)

Mr. Harris: Yes, that is exactly what we are talking about.

The Court: What you want to know is what is meant by that language, "both dimensions perpendicular to the general direction of flow"?

Mr. Harris: Exactly, your Honor.

The Witness: Shall I go ahead?

The Court: How could both dimensions be perpendicular?

The Witness: As my three fingers are now, approximately perpendicular to each other, a three co-ordinate system as might be described by the two adjacent edges of a bridge table and the leg of the bridge table at that corner, there are three lines——

The Court: I don't play bridge.

The Witness: Poker tables are round and I don't know whether you play poker or not.

We can use a book for demonstration, one at the lower edge of the cover of the book, with it normally right side up, the vertical edge of the cover of the book, and a line going down the corner of the pages constitute the axis of a three-dimensional system as it is understood in mathematics and in [232] engineering. These dimensions are at 90 degrees to each other.

The Court: They are perpendicular, you mean?

The Witness: They are perpendicular to each other. So if we let the direction of the air flow, the intended direction of the flow of the medium to be filtered, be the corners of the pages as they may align, then the other two dimensions may be repre-

(Testimony of Sydney F. Duncan.)

sented by the bottom edge of the cover of the book and the side edge of the cover of the book. These two dimensions, then, are perpendicular to each other and are in a plane which is perpendicular to the direction of the flow of the medium to be filtered.

The Court: Yes. In other words, assuming the medium to be filtered flows in one direction, the other two dimensions are what you call "both dimensions"?

The Witness: Both dimensions.

The Court: And they are both perpendicular to the direction of the flow?

The Witness: Yes.

The Court: That is, the bottom of the book and the face of the book are perpendicular to the thickness of the book?

The Witness: Yes.

By Mr. Harris:

Q. A third dimension of the Farr panel as shown in the '479 patent is its thickness, is it not?

A. Correct. [233]

Q. Now, referring to the round Farr filter which is Exhibit D, is the face of the filter subdivided in both dimensions in the same sense?

A. I say yes.

Q. Explain your answer. How is it subdivided in both dimensions?

A. It is divided by the fact that as you follow a line which lies in the face of the filter, which would be a line at least of the dimensions perpendic-

(Testimony of Sydney F. Duncan.)

ular to the intended direction of flow of the medium to be filtered, you cross screen layers. If you assume the third dimension, the axis to be, say, going into a particular one of the passages formed with the crimped screen layer, and you choose the two dimensions in the face of the filter, so that one of them is radial of the round filter and the other one is tangential to a circle in the face of the filter, then, following either one of those lines, we find that we encounter areas of screen through which we have to pass, and, therefore, we have multiple subdivision in both dimensions of the face of the filter.

Q. Well, with this round filter, your dimensions could be any radii of the filter, could they not?

The Court: What?

Mr. Harris: Radii.

A. They would have to be 90 degrees to each other. [234] There could not be two radii which were 30 degrees apart, unless you define a special dimensioning system.

By Mr. Harris:

Q. Well, Mr. Duncan, can you say a circle has more than one dimension, that is, radius?

A. Well, if you are defining the circle as the line or if you are talking about a circular area, a circular area certainly has two dimensions.

Q. What are they?

A. They are two radii at 90 degrees to each other. The size of the circle is constant. There is only one size to the circle, but the circular area lies in a two-dimensional plane.

(Testimony of Sydney F. Duncan.)

Q. Now, we have been talking about the face of the Farr panel shown in the '479 patent. Is that true that the alternate screens, crimped and uncrimped screens, subdivide the panel in both dimensions throughout the thickness of the panel?

A. Yes.

Q. And in the Farr panel shown in the patent in suit, that subdivision provides passageways which extend from the inlet to the outlet faces of the panel, does it not?

A. The crimped screen provides the passageways. [235]

Q. And those passageways, each of them, is wholly surrounded by a crimped screen?

A. Yes, in the Farr filter.

Q. Well, I shouldn't say that, that is misleading and the record shouldn't show it, because I think one wall of each one of those passageways will be a flat screen. That is correct, is it not?

A. (Pause.)

Q. I don't want to mislead you.

A. In the example——

The Court: It still surrounds it even though it is flat, does it not?

By Mr. Harris:

Q. My question was, don't the crimped screens wholly surround the passageways. I don't think that is correct.

A. In Exhibit 2 the passageways are partially bounded by flat screen and partially bounded by crimped screen.

(Testimony of Sydney F. Duncan.)

Q. Those passageways go clear through and are confined or restricted passageways, are they not?

A. Yes.

Q. Now actually, so far as the Farr patent in suit is concerned and the panels made in accordance with it, you don't much care what the condition of the subdivision is at the face of the panel, what you care about is the subdivision throughout the thickness of the panel, isn't that correct? [236]

A. I like the subdivision at the face and other places.

Q. Well, if you merely had a subdivision at the face you wouldn't necessarily have any filtering action taking place if it wasn't subdivided back in the depth of the panel, would you?

A. I don't see why we wouldn't have filtering action take place.

Mr. Harris: I produce a model which I ask be marked as Defendants' Exhibit G for identification.

(The model referred to was marked Defendants' Exhibit G for identification.)

By Mr. Harris:

Q. Showing you this model, Mr. Duncan, which contains at the bottom—first of all, at the top it has a plate on the outside with the word "Farr" on it at the top. We will call that the top.

A. Yes.

Q. Now at the bottom it has a number of layers stacked of the same type of filtering media that is used in the Farr panel, does it not? I don't mean

(Testimony of Sydney F. Duncan.)

with regard to the size of the mesh or the exact crimps, but it is generally similar?

A. It is typical.

Q. Yes?            A. Yes. [237]

Q. The upper portion of that model has alternate crimped and uncrimped layers of wire mesh which are spaced apart on the rods that extend vertically through it, do they not?            A. Yes.

Q. Now, then, taking the layer of crimped material which is first above the stacked layers at the bottom.

A. And spaced away from them for approximately  $\frac{3}{8}$  of an inch?

Q. Yes, that is the layer I am referring to.

Now, then, if we bend one edge of that layer down so it hooks onto the flat screen in the layer below it all the way across, then we have, do we not, so far as that layer and the flat screen layer below is concerned, a multiple subdivision of the face in two dimensions?            A. Yes.

Q. But if we turn this around there is wide open space between the face and the back of the filter panel between those two layers, isn't there?

A. I think of the filter as having two faces. The face of the panel is the rough plane on which you can terminate the filter media and it has a face on each side.

I don't think I have restricted any of my thinking or remarks to the front being the face and the back being something else, so that this face of the filter which is now [238] toward me with this bent down,

(Testimony of Sydney F. Duncan.)

which you have described is not multiply subdivided but the face which is away from me is multiply subdivided.

\* \* \* \* \* [239]

By Mr. Harris:

Q. Mr. Duncan, yesterday in your direct examination, relative to the bulletin, Exhibit No. 7, and various tests that you made, you stated in effect that the Farr type panels were rated at 1200 cubic feet of air per minute, whereas, the Air-Maze Type B panel was rated at 800 cubic feet of air per minute. My understanding was that you stated—and I think the record is clear that you did—that the Farr panels that were brought out initially by the Farr Company were rated at 1200 cubic feet per minute. That is not a fact, is it? As a matter of fact, the Farr panels, when they first came out, were rated at 800 cubic feet per minute, just as was the Type B Air-Maze panel?

A. I think that may be right. I don't remember for sure.

Mr. Harris: I produce a Farr catalog, which I ask be marked as Defendants' Exhibit H for identification.

(Said catalog was marked Defendants' Exhibit H for identification.) [240]

By Mr. Harris:

Q. Mr. Duncan, do you recognize this catalog as a catalog published by the Farr Company as early as 1941?

(Testimony of Sydney F. Duncan.)

A. It is a Farr Company catalog, but I am not sure of its date, because I don't find a mark on it, and I don't remember precisely when each one of the catalogs was published.

Q. I call your attention to the statement on the second page of that catalog, under the heading "Test Data." It states, "All metallic wire screen permanent type, 800 cubic feet through 20 by 20 by 2-inch filter." I show that to you. A. I see it.

Q. Do you recognize that as a representation made by the Farr Company to the trade at that time? A. Yes.

Mr. Harris: I might further identify this catalog as Bulletin No. F-161.

Q. Referring back to the catalog, Plaintiff's Exhibit No. 7, of which you have a copy in front of you, on the back of that catalog, the second view from the top in the left-hand column, the rotary cooler, does that device have a construction as disclosed in the Farr Patent No. 2,286,480? You are familiar with that Farr patent, are you not?

A. Yes. I have a copy here.

Q. Is the construction of that device shown in the [241] catalog substantially similar to that described in the Farr patent I just numbered?

A. Yes. [242]

Q. And is the face of the panel in that device subdivided in both dimensions perpendicular to the flow of air through the device? A. Yes.

Q. Now in the '479 patent here in suit, is it unnecessary to pass the air, or to have the air pass



(Testimony of Sydney F. Duncan.)

through, the screens of that filter panel in order to get the desired filtering efficiency?

A. Did you say is it unnecessary?

Q. I said, is it or is it not necessary to have the air pass through the screens to get the desired filter efficiency.

A. It is necessary to have the air pass through the screen, at least some of the air pass through the screen.

The Court: Not all the air?

The Witness: Not all the air has to pass through the screen in order to achieve the efficiency.

The Court: But enough has to pass through to create a turbulence in the air that does not, so that it comes in contact with the mesh, is that it?

The Witness: Yes, your Honor.

By Mr. Harris:

Now all of these four filters of the type of the '479 patent in suit prior to use are dipped in oil, are they not?

A. Yes, they are. [243]

Q. And if that oil fills the mesh of the screens the air could not pass through the mesh, could it?

A. No.

Q. So that whether the air passes through the mesh of the screens or not depends in part upon the viscosity of the oil used, is that correct?

A. Yes.

Q. And upon the size of the mesh of the screen used?

A. That is right.

Q. And it also depends upon the temperature conditions under which the particular filter panel is used, doesn't it?

(Testimony of Sydney F. Duncan.)

A. The temperature conditions under which it is dipped?

Q. Well, suppose we had one of these filter panels of the Farr type in Nome, Alaska, as of the winter season, and we dipped it in 50 S.A.E. oil, put it outside in an outside installation, the oil would very quickly congeal and probably freeze, would it not?

A. I don't think the oil would freeze.

Q. It would at least congeal very solidly?

A. Well, we were speaking a while ago about manufacturer's recommendations and the manufacturer's recommendation, at least ours, to the customer is that he dip his filter, if he dips it, at a specified temperature, say around 70 degrees, or room temperature, as we ordinarily encounter it, [244] and that prior to installation in the place where it is to collect dust that it be allowed to drain for a specified period of time.

Now, then, I don't know from your question whether you contend that these recommendations shall be followed or not.

Q. I am not interested in the recommendations; I am interested in what happens when a buyer uses one of these filters in Nome, Alaska, under the circumstances which I have named.

The Court: Where would he dip the oil, outdoors or indoors?

Mr. Harris: I don't care where he dips it, just so he gets the oil on it and hangs it outside immediately without letting it drain.

(Testimony of Sydney F. Duncan.)

Q. Now under those circumstances, wouldn't the mesh of the screens be effectively plugged with congealed oil?      A. They might be.

Q. So that whether or not the air will go through the screens in the Farr filter depends, in addition to the other factors you have mentioned, upon the atmospheric conditions under which it is employed and the conditions under which it is dipped and prepared for use, does it not?

A. If you include all possible combinations of those things, the answer has to be yes.

Q. And do you find any statement or teaching in the [245] '479 patent in suit that the viscosity of the oil used has anything to do with the effectiveness of the filter?

A. As I remember it, the viscosity of the oil is not mentioned.

Q. Do you find anything in the patent in suit which indicates that the size of the mesh of the screen is at least critical in that respect?

A. I think I can find it in just a minute. (Examining document.)

On page 4 of the '479 patent in line 18, in a portion of the patent discussing the mode of operation of the patent——

Q. The first or second column?

A. The second column—the sentence starts in and reads this way: “This indicates that the air entering the passage 7 is almost immediately broken up into fine streams of air flowing through the screening openings of the wire forming the passage.”

(Testimony of Sydney F. Duncan.)

This teaches me that the arrangement, the combination of size of mesh, size of wire, conditions of dipping, viscosity of oil, and so forth, must be such that air can flow through the holes in the screen.

Q. But for the particular condition of operation, you would have to determine that by experiment, wouldn't you? A. Yes.

Q. Now in the filter panel of the '479 patent, there [246] is no compulsion for air to pass through the flat screens embodied in it, is there?

A. No, I would say not. There is not compulsion in the usual sense of the word.

Q. Now you said I think that in the Air-Maze P-5 filter charged to infringe the patent in suit, that the alternate crimped sheets subdivide the panel into—they are subdivided in two dimensions perpendicular to the flow of air through the filter panel. I don't know whether I am paraphrasing you correctly, but that is the effect of your testimony, is it not? A. Yes. [247]

Q. Did you mean throughout the depth of the panel or only at the face of the Air-Maze P-5 panel?

A. I did not specify any particular location, but it may be subdivided at the face, either at the face or at other points in the panel.

Q. There are, however, in the P-5 filter no well-defined passages or channels through the filter bed, are there?

A. There are quite well-defined passages or described lines as tunnels formed by the Z-crimp, the so-called Z-shaped crimp, with two changes in direction.

(Testimony of Sydney F. Duncan.)

Mr. Harris: I produce a plastic model which I ask be marked Defendants' Exhibit I, for identification.

(The model referred to was marked Defendants' Exhibit I for identification.)

Mr. Harris: I might say that these two strips of plastic are held together by a rubber band, in their present state.

Q. Mr. Duncan, would you examine these and see if, in fact, each of those plastic strips doesn't correspond in general configuration to one of the mesh sheets in the Air-Maze P-5 filter?

A. Each one of these strips is apparently formed in a die, with corrugations in what has been called a Z shape similar to the screen media of Plaintiff's Exhibit 6; yes, [248] I think these conform.

Q. Now, I call your attention to the fact that one of these strips has green paint or green dye or some kind on the crests of the corrugations, and the other strip has red paint or dye on the crests of its corrugations. That is correct, is it not?

A. Yes, there are green stripes on one and red stripes on the other.

Q. And these, as put together here, are with the dyed crests adjacent to each other, in other words, they are on the inside of the two strips as we have them here?      A. Yes.

Q. Now, isn't it a fact that when you look through this plastic model, the green lines will rep-

(Testimony of Sydney F. Duncan.)

resent the crests of the corrugations on one strip and the red lines will represent the crests of the corrugations on the other strip?      A. Yes.

Q. And isn't it a fact it is only where those green and red lines appear to cross or touch that there is any contact between the two strips?

A. That would be true.

Q. And isn't it a fact, also that with a construction of this kind, air can pass laterally from one side of the filter bed to the other side, not through it from front to back, but laterally through it, without ever going through [249] any screen member?

Mr. Leonard S. Lyon: Are you asking the witness whether that is true in operation of the filter or just as you are holding that specimen in your hand?

Mr. Harris: Well, I am asking as to this, whether or not there are openings which pass——

The Court: You mean in those two plastic things?

Mr. Harris: In these two plastic things, which pass from side to side of the filter.

The Court: They are not perforated like screens.

Mr. Harris: That is right, your Honor, but air could pass directly from side to side through this plastic model, could it not?

The Witness: I don't think it could do it, in a straight line, at all.

By Mr. Harris:

Q. However, there are openings which go through laterally from side to side, open spaces through which air could move, possibly?

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: In the operation of the filter?

The Court: In the operation of the plastic model.

\* \* \* \* \* [250]

The Witness: Well, I think I can answer it in this way: There is a path in this plastic model that air could follow and traverse the model laterally to the direction, the general direction, of air flow in the filter, for which this is some kind of an example. [251]

Mr. Harris: I produce a sketch which I ask be marked as Defendants' Exhibit J for identification.

(The document referred to was marked Defendants' Exhibit J for identification.)

By Mr. Harris:

Q. Mr. Duncan, I show you Defendants' Exhibit J for identification, with the intent that this illustrate by a drawing the plastic model which we have just identified as Defendants' Exhibit I. Assuming that the red and green lines in this drawing again indicate the crests of the corrugations as shown by Exhibit I, and that the only places where the two adjacent members meet are where the red and green lines touch or cross, that being the case, a flow of air in the direction of the blue arrow underneath the sketch, flowing in through one of the entrance openings in the filter panel, could divide and go through a very large number of paths going from the upstream side to the downstream side, could it not, as indicated by the blue lines in this sketch?

Mr. Leonard S. Lyon: This is in respect to this

(Testimony of Sydney F. Duncan.)

plastic model, not in respect to the Air-Maze P-5 devices, although I notice the title on this page isn't incorporated in your statement, in your question.

The Court: Does your question relate to the Air-Maze P-5 as constructed, or does it relate to the plastic panel?

Mr. Harris: Well, this relates to the Air-Maze P-5 as [252] constructed.

The Court: That is your assumption in the question, is it?

Mr. Harris: Yes, your Honor.

The Witness: There are a number of paths—with an entering air stream, or filament entering, as you said, one of the openings in the face of the P-5 filter, there are several paths that that stream of air can be divided into and pass through the filter by following portions of the passages formed by the crimp of the P-5 filter. [253]

The Court: Well then——

The Witness: Whether the exact pattern is as shown on Exhibit J or not, I am not prepared to state on short notice, but the pattern would be something like this.

The Court: Assuming that these were crimped screens.

The Witness: If they were crimped screens——

The Court: That is what his assumption is.

The Witness: That is right. My answer was made on that basis, that entering one of the openings formed by two crimps registering on the face of the filter, there are a number of paths that the air



(Testimony of Sydney F. Duncan.)

stream defined by this opening could be divided into and pass through the filter by following portions of the passages formed by the crimps of this screen layer.

The Court: In other words, some of the air would take this path, others would go straight through the holes in the screen?

The Witness: Undoubtedly.

The Court: Some might go up, some might go down.

The Witness: The only way that the air can get through the plastic model——

The Court: He is talking about the screen now.

The Witness: I wish to compare the plastic model for a moment.

If it enters one of those little openings on either edge [254] it has to flow down a passage formed by the crimp and then in order to avoid going through the plastic, which of course is imperforate, then it has to be deflected up and over one of the red or green crests.

Now a similar path exists through the P-5 screen media but the air would have to be deflected up and over the crest of the screen which has holes in it.

This would not insure any particular amount of air following this blue path through the filter or any portion of it without ever passing through a screen.  
By Mr. Harris:

Q. Well, now, as to the diagram J, Exhibit J, actually the blue lines are not intended to represent a flow in one plane. Actually, in the Air-Maze P-5

(Testimony of Sydney F. Duncan.)

filter the air through any of those paths must flow up and down, over and under the corrugations, would it not?

Mr. Leonard S. Lyon: Just a minute. Are you asking about what the air would do in the actual operation of a P-5 filter?

Mr. Harris: Yes, sir.

Mr. Leonard S. Lyon: You haven't had the witness answer that.

The Court: He just got through asking him.

The Witness: It is asking quite a bit of a filament of air to decide to go up and over, but I have already said [255] that a path exists through the filter going up and over and under and around the screen crimps, so that the path exists.

The Court: If all the holes in the screen were filled, would it take this pattern?

The Witness: Yes, in the plastic model——

The Court: I mean in the wire model, if they were all filled up and clogged up.

The Witness: Then we have essentially the plastic model. Then it could take this kind of a path which would involve flow up and down.

The Court: In that P-5 filter, is there any turbulence created by virtue of the air passing through the holes of the screen?

The Witness: Just in the same fashion as in the Farr filter.

By Mr. Harris:

Q. Now referring to this sketch, Exhibit J, there are little round circles in ink on this sketch which

illustrate the points of intersection or touching of the red and green corrugation lines.

A. I see them.

Q. Now those are only obstructions other than the formation of the crimp itself to the flow of air through the P-5 filter, are they not?

The Court: Made of screen? [256]

Mr. Harris: Yes, they are made of screen.

The Witness: Yes, this is the filter made of screen.

Mr. Harris: Yes.

The Witness: And the question, as I understood it, these little circles, which could be drawn all over the place——

Mr. Harris: Yes.

The Witness: There are just a few of them drawn instead of all of the ones shown——

Mr. Harris: Yes.

The Witness: Those represent, as you said, the places where a crimp, one crimp of one layer, touches the crimp of another layer.

Mr. Harris: Yes.

The Witness: Those constitute obstructions to air flow. That is right.

The Court: His question was, were they the only obstructions? Was that not your question?

Mr. Harris: I will ask that question.

Q. Are they the only obstructions?

The Court: I thought that was your question.

The Witness: The only obstructions other than, as you said, the undulations necessary to get over

(Testimony of Sydney F. Duncan.)

the top of one crimp and into the next valley, so to speak. [257]

By Mr. Harris:

Q. So that any of these pathways through the Air-Maze P-5 filters are interconnected, or is interconnected, with other adjacent passageways laterally, is it not, by open spaces?

A. Not exactly laterally, according to your sketch. The connections are at some angle to a line perpendicular through the filter or a line laterally through the filter, but they are interconnected.

Q. Are these obstruction points, the little circles illustrated here, are those the parts that subdivide this Air-Maze P-5 filter in two dimensions relative to the direction of flow of the air?

A. They certainly do in my estimation subdivide the panel in two dimensions.

Q. Are those the only things that subdivide them in two dimensions?      A. I think so.

Q. Now, Mr. Duncan, I am standing approximately in the middle of this court room. Assume I was tall enough to reach the ceiling. Would I subdivide the court room in the horizontal plane within the meaning that you use the word "subdivide" when referring to this Air-Maze construction? I am just a pillar here standing clear up to the ceiling, all alone, the air can go around me on both sides; do I subdivide [258]this courtroom in a dimension in the horizontal plane?

A. In the plane of the courtroom in which you stand and air flows around you on two sides, your

feet on the floor, your head in the ceiling, you certainly divide the air flow at that point, subdivide, if you please, into two streams.

Q. And that is the sense in which you say that these points of intersection in the Air-Maze P-5 filter subdivide the air flow?

A. Cause a subdivision of the airflow.

Q. You have been employed as a consultant by Far Company or its predecessor since about 1939, have you?

A. I have consulted with them, as I said, as a friend and a consultant since that time.

Q. And this year you are on sabatical leave from the university?

A. It is not exactly sabatical leave. There is a technical difference. It is just a leave.

Q. Very well. During this year, however, you are spending full time with the Farr Company?

A. That is right.

Q. And you are being paid for your time, are you not?

A. Oh, yes.

Q. Monthly? A. Monthly. [259]

Q. Are you an officer of the Farr Company?

A. No.

Q. Are you a director?

A. I have the title of Director of Research.

Q. Are you a member of the board of directors of the Farr Company?

A. No.

Q. Are you a shareholder in the Farr Company?

A. No. [260]

\* \* \* \* \*

(Testimony of Sydney F. Duncan.)

Redirect Examination

By Mr. Leonard S. Lyon:

Q. Will you refer to Defendants' Exhibit F, the bulletin A-100-4, and on the second page is Fig. 3, typical applications of air filters to unit type equipment.

A. (Examining exhibit.)

Q. You were asked some questions about the arrangement of the filters as shown in that figure.

The Court: Fig. 3?

Mr. Leonard S. Lyon: Yes, Fig. 3.

Q. Will you tell us whether these illustrations, each one of them which bears a legend, which of these illustrations refer to the prior art filters and which of them refer to the arrangement of Farr filters?

A. The filter under which one of the little figures [262] only mentions Farr filters is in that figure to the extreme right which reads, "Equal Area, Far-Air Filters." The point made by the sequence of little figures is that with the higher air capacity of the Farr filter these various arrangements shown as expanded filter, offset filter, slanted filter, double slanted filter, need not be adopted to install Farr filters.

Q. Will you refer to Exhibit 11?

A. I don't have it.

Mr. Leonard S. Lyon: Do you have Exhibit 11, Mr. Clerk?

(The exhibit referred to was passed to counsel.)

(Testimony of Sydney F. Duncan.)

By Leonard S. Lyon:

Q. You were asked if there was any difference in performance shown by the curves on this Exhibit 11 up to a dust load of 500, and I think you testified there was no substantial difference up to that point.

What is the significance of the difference that appears following the dust load of 500 as shown by that exhibit?

A. The significance of the different shapes of the pressure drop characteristics and the efficiency characteristics for the two filters compared on this Exhibit 11 illustrate, as I said before, the difference in mode of operation of the two filters. It is true that if one covers up the right-hand half of the page that there are two sets of curves which are not too different from each other. [263]

If, however, through inadvertence of some other atmospheric, unusual atmospheric condition, the load on either one of these filters were to pass 500 grams on a 20 x 20 panel, then the characteristic curves shown to the right of 500 grams would go into effect and on one filter the pressure would rise rapidly, whereas on the Farr filter the pressure rises very slowly, thus demonstrating again the difference in mode of operation. To be sure, the so-called Air-Maze type B efficiency also rises but that, as I explained before, was because some of the openings were getting too small to pass dust.

Q. Is Exhibit 11 intended to signify that there is no significance, no importance, to the fact that

(Testimony of Sydney F. Duncan.)

the curves remain substantially the same up to the 500 point dust load?

\* \* \* \* \*

The Witness: No, these curves are not intended to show the similarity below 500, but the load tests had to be carried out further to demonstrate the characteristic operation of the two types of filters. [264]

Mr. Leonard S. Lyon: May I have Exhibit 6, please?

(The exhibit referred to was passed to counsel.) [265]

By Mr. Leonard S. Lyon:

Q. I hand you Exhibit No. 6, which is the Air-Maze P-5 filter medium, and ask you if, by using a piece of string, you can demonstrate to the Court whether or not there are passages through the filter which the air can take without passing through any screen or shifting from one passageway to the other.

A. I can, if I have a piece of string, but the string would simply be laid in one of these corrugations.

Mr. Leonard S. Lyon: I would like to show it to the Court. I would like the Court to see it.

The Witness: And the two of them be back together, if that will do.

In this fashion here (illustrating). You see, the string is loose and can be—well, it should be a heavier piece of string. It doesn't do exactly what



(Testimony of Sydney F. Duncan.)

I would like it to do. With a larger cord, it could be laid right in the Z-shaped crimp and pass right through the filter.

By Mr. Leonard S. Lyon:

Q. Now, in Exhibit 4, the Air-Maze Type P-5 bulletin, reference is made on page 2 to the “‘Z’ shaped channels (see illustration at right).” Will you compare the paths through the filter, which you have just demonstrated with the string on Exhibit No. 6, with the channel indicated by the arrows on the figure appearing at the lower right?hand corner of [266] Exhibit 4?

A. The arrows indicate the same passage as I attempted to demonstrate with the string. The bulletin reads, “Arrows show how more than a million tiny openings plus three changes of air flow, remove dirt from air stream and deposit it evenly on viscous-coated wire baffles.” And then the arrows show flow entering the Z-crimp and going right straight through the Z-crimp.

Q. Now, will you tell us what would happen to the air—and if different things happen to different parts of the air, what different things happen to the air—in passing through the Air-Maze filter, the P-5 filter?

A. Well, the same fundamental division of the air stream into many fine filaments takes place initially at the face of the filter. I think perhaps this can be seen in one of the pieces of Exhibit 15, that is that plastic chunk with media in it.

(Testimony of Sydney F. Duncan.)

Exhibit 15 is in a little box there. That is it. A long thin piece of this plastic shows the initial subdivision into a number of finer or small filaments of air flow.

If the mesh of the screen is open, a certain amount of flow will take place through the mesh of the screen; whereupon, the air flowing through the mesh of one small area of screen will find itself in another passage, causing turbulence in that passage, and proceeding thus through the filter, [267] having always the opportunity to flow either through the mesh of the screen or through a passage, depending upon the pressure and the conditions in the filter, dirt loading, oil coating of the wires, and so on, the factors, the flow will be complex and not particularly easy to describe, but certainly it embodies these features of having the presence of flow either through the passage or through the mesh of the screen.

\* \* \* \* \*

Q. Well, I want you to describe the operation of the Air-Maze filter, now, both with respect to what function is [268] provided by the passages through the filter and by the subdivisions formed by the wire mesh.

A. The subdivisions formed by the wire mesh are these contact points where the corrugations or crimps touch each other, subdivide the approaching air flow into many fine filaments. These filaments, then, through flowing into passages that are relatively rough and through encountering small

(Testimony of Sydney F. Duncan.)

areas of screen that are at an angle to their general flow, part of the air flows down the passage a little ways, some of it flows through the screen and into an adjacent passage, and this flow down the passage and through the screen takes place on through the filter. As to whether the screen mesh becomes clogged completely or not, any reduction in size of the screen opening through an accumulation of dirt on the wires of the screen will restrict the flow through the mesh of the screen and so deflect more and more of it down the passages formed by the crimp of the screen, and, while it has been remarked that the pictures of Exhibit No. 14 do not show screen meshes that are completely plugged, it does show definitely that many of the screen meshes are seriously closed off and so would impede the air flow through them. The test could have been continued until they were plugged.

Q. Well, will you compare what you have said now with respect to the operation of the P-5 filter with the operation that takes place in the Farr filter of the patent in suit? [269]

A. Well, it has been pointed out that there is no "compulsion of the air to flow through the flat screen" in the Farr filter, however, there are small areas of screen disposed at various angles to the general flow of air, and so, air flowing into the upstream side or face of the filter is subdivided by the crimped screen into small filaments. These filaments, while they are first divided so as to flow into a passage, immediately encounter screen mesh

(Testimony of Sydney F. Duncan.)

areas and so part of the air flows perhaps a little ways along the passage, but part of it flows through a small area of screen and into an adjacent passage where it causes turbulence just as in the P-5 filter.

Q. Now, is it essential to the operation of both the P-5 and the Farr patented filter of the patent in suit that there be a screen wire or mesh through which part of the air flows and forms turbulence?

A. Yes.

Q. You have been asked some questions about oiling the screens. Was there anything new or original about oiling a filter made of wire screen at the time that this Farr filter was invented, or was that an old practice in this art?

A. As I understand it, it was an old practice.

Q. Would you, as an engineer reading the Farr patent in suit, have any difficulty in finding a suitable oil for use in the Farr filter, patented filter? [270]

A. No; no particularly difficulty.

Q. Would you understand, from reading the patent in suit, that you should use such an oil and take such pains in draining that the perforations through the wire screen should remain open at the beginning of the operation of the filter?

A. Well, I quoted a portion of the patent a few moments ago that describes the flow as having to take place through the mesh of the screen. Therefore, it must be open. Just a matter of house-keeping would indicate to me that I should let the filter drain a while to get ride of the excess

(Testimony of Sydney F. Duncan.)

oil or I would have a dripping all over the place when it is installed. And the use of suitable oil would then depend upon just my judgment as to whether I wanted a heavy oil or a light oil or whether I was at the North Pole or at the Equator.

Q. Are the oils that are used in oiling these Farr patented filters commercially available oils, or did any special oil have to be designed?

A. No, no special oil had to be designed. We might achieve better results with a special oil, and some people or some companies have a particular oil that they recommend. We have used airplane engine crankcase oil, the usual kind, for coating some filters.

The Court: After it has been filtered? [271]

The Witness: Before it has been used.

The Court: Before it is used?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Is it necessary to use any particular oil to oil the Farr patented filter?

A. No, sir. I don't think so.

Q. Do you know what oil is used to oil an Air-Maze P-5 filter?      A. No.

Q. Now, in the operation of the Air-Maze P-5 filter, will you tell us how the air passes through that filter with respect to whether or not there is any lateral flow of air across the filter that doesn't go through the wire mesh or wire screen?

A. When the filter is installed and passing air through it in its normal direction, from one face

(Testimony of Sydney F. Duncan.)

to the other, there will be a pressure drop through the filter. This pressure drop through any filter doesn't take place just at the face or just in the middle—it is a gradual thing that takes place through the filter. It is a principle of fluid mechanics that in general the flow will be toward a place where the pressure is lower. There are some exceptions to this, but in the case of the filter the principle applies fairly well. [272]

Now, the pressure distribution laterally of the filter at any given plane, say half an inch or an inch from the face of the filter, will be probably pretty uniform, so that there will not exist serious pressure differences which will cause flow laterally in the filter. If such flow does take place, it will have to make several changes in direction to get anywhere.

If I may have Exhibit 15 again, the plastic cast filter. Exhibit 15 shows in one of the cut faces quite clearly the kind of lateral path that exists in the filter. Examining this passage right here, defined by the ends of the wires as they meet the surface of the cut plastic on the lowest step, there is a winding passage which extends laterally of the filter. In order to follow that passage, the air would have to make numerous changes in direction, to avoid going through a screen.

Q. I wanted you to say as to whether or not, in the operation of the Farr filter, the air does actually move laterally from one channel through the screen to another, without going through the screen.

(Testimony of Sydney F. Duncan.)

A. In the Farr filter or the P-5?

Q. The Air-Maze P-5.

A. The Air-Maze P-5.

The Court: That is just what you are explaining, the P-5?

The Witness: Yes. But I understood Mr. Lyon to say the [273] Farr filter.

Mr. Leonard S. Lyon: I am referring to the P-5 filter.

The Witness: There is very little tendency for lateral flow to take place in the P-5 filter media, because principally of the numerous changes in direction that it must have, and because there is no particular pressure gradient or decrease of pressure laterally in any particular direction to cause that flow to take place. [274]

\* \* \* \* \*

## RICHARD SPENCER FARR

called as a witness hereinby and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Richard Spencer Farr.

The Clerk: And your address?

The Witness: 4810 Keniston Avenue, Los Angeles 43.

### Direct Examination

By Mr. Leonard S. Lyon:

Q. Mr. Farr, how old are you? A. 36.

(Testimony of Richard Spencer Farr.)

Q. What is your occupation?

A. I am president of the Farr Company in charge of sales and engineering.

Q. How long have you been connected with the Farr Company? [275]

A. Since its inception in 1937.

Q. Were you related to Morrill N. Farr, the inventor named in the patent in suit, 2,286,479?

A. Yes, I am his son.

Q. Who was associated with you in the formation of the Farr Company?

A. My father, my brother, and myself.

Q. Your brother is Spencer Farr?

A. Yes, Morrill Spencer Farr.

Q. Who is here in the court room?

A. Yes, sir.

Q. At that time was your father active in the formation of the Farr Company?      A. Yes.

Q. And how long did he remain active in the operation of the Farr Company?

A. Until he passed away in November 24, 1949.

Q. Now at the start of the Farr Company, did you start the Farr Company as a completely new business?      A. Yes.

Q. And who were the organizers of the Farr Company?

A. Well, my father, my brother, and myself.

Q. And when you first started the operation of the Farr Company, did you start in business by manufacturing an air filter? [276]

A. No, sir.



(Testimony of Richard Spencer Farr.)

Q. When did you start the first operation of the Farr Company?

A. Repeat the question, please.

(The question referred to was read by the reporter, as follows:

(“Q. When did you start the first operation of the Farr Company?”)

The Witness: July 1937.

By Mr. Leonard S. Lyon:

Q. And you started in as sales manager at that time in charge of sales and engineering?

A. At that time there were just the three of us, and we all did everything.

Q. How long was it after the Farr Company started in operation before you started the manufacture of an air filter panel?

A. If my memory serves me correct, we started manufacturing the air filter panel in 1940.

Q. Have you continued the manufacture of that air filter ever since?      A. Yes.

Q. Have you manufactured any other type of air filter except the filter described in the patent in suit, No. 2,286,479? [277]      A. No.

Q. Now are you familiar, as an engineer or technical man, with the construction and mode of operation of that Farr filter?      A. Yes.

Mr. Harris: Excuse me, if the Court please. I don't believe there is any foundation as to what this witness' engineering or technical qualifications are.

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I will be glad to fill that in.

Q. What technical training did you have before you organized the Farr Company?

A. I attended an engineering school for four years, graduating in 1937.

Q. What school?

A. University of Southern California.

The Court: What branch of engineering?

The Witness: I got a Bachelor of Science degree in general engineering.

By Mr. Leonard S. Lyon:

Q. Now you say that you have been director of sales of the Farr Company since it was organized?

A. Well, that is probably not quite correct. I have been in charge of sales for the past several years. At the start of our company we were just the three of us and we did our manufacturing and selling and all of us did a little of [278] everything.

Q. What are the procedures that you have followed in selling Farr filters of the patent in suit? I mean by that, what do you do to induce a customer to choose one of the Farr patented filters over some other filter?

A. I explain the method of operation of the filter and try to point out to the prospective buyer just how the filter operates, and why it is a piece of equipment that he should use.

Q. Do you make these explanations usually to untrained or to technical people?

(Testimony of Richard Spencer Farr.)

A. Well, a large percentage of our sales are to technically trained people.

Q. Is your explanation usually a technical one?

A. In many cases.

Q. In selling the filter and discussing it with these technical prospective customers, do you refer to the construction of the filter? A. Yes.

Q. Do you also refer to its method of operation?

A. Yes.

Q. Do you make any comparisons of its performance characteristics with other filters?

A. Yes. I explain how it operates.

Q. Do you understand and are you fully acquainted with [279] the test methods and the test equipment which has been worked out by the Farr Company to which Mr. Duncan referred in his testimony? A. Yes.

Q. Do you refer to that test equipment or those test methods and the results of those tests in your discussions with the technical prospective customers on various occasions? A. Yes. [280]

\* \* \* \* \*

Q. What features of construction of the Farr filter do you rely upon and emphasize in promoting the sales of [283] that filter?

The Court: You may have your objection to this line of questioning.

Mr. Harris: Thank you, Your Honor.

The Witness: Well, the features that we have emphasized most of all is its high efficiency, high dust collecting efficiency, its large dust holding

(Testimony of Richard Spencer Farr.)

capacity, and its low pressure loss and low rate of change of pressure loss during the life of the filter between cleanings.

Those are the points that we have emphasized to customers and it has been probably the factors that have made the sale of our product possible.

By Mr. Leonard S. Lyon:

Q. In the beginning of the operations of the Farr Company, when you first undertook to sell these patented filters, what other filters were you trying to outsell?

A. Well, primarily the filters that were being sold on the market at that time, which were those shown and disclosed in the Greene patent—that was one of the large competitors.

Another competitor was the American Air Filter Company, which had a filter that I believe was described earlier, where it had an expanded metal face with slots in it, and went through a series of chain knit wire cloth.

Those at the time we started our business were perhaps [284] the two filters that were being used most widely.

\* \* \* \* \*

Q. Will you state as you knew them, if you did know them, at the time in question, the characteristics of the filter of the Greene patent which has been shown here to be manufactured by the defendant Air-Maze Corporation? How did its characteristics compare with the Farr filter that you mentioned?

(Testimony of Richard Spencer Farr.)

Mr. Baldwin: We object. There is still no foundation as to how he knew.

Mr. Leonard S. Lyon: I think that is a matter of cross-examination.

The Court: Overruled.

Greene, you say?

Mr. Leonard S. Lyon: Yes, Your Honor. That is the old style Air-Maze filter.

The Witness: After we had developed—— [285]

Mr. Leonard S. Lyon: Just a minute, please.

The Court: Go ahead.

The Witness: After we had developed our filter and run our own tests on it and started to sell it, naturally we were interested in seeing what was being offered on the market at that time, and we came across the Air-Maze filters that were manufactured under the Greene patent.

We obtained some of those filters and ran tests to see how our performance compared with the performance of the Air-Maze filter.

Those tests showed up that our filter had a higher efficiency, a greater dust holding capacity, and again a low, uniform pressure loss during the period of feeding dust to the filter.

That was also true of the American air filter that was being sold and widely distributed at that time. By Mr. Leonard S. Lyon:

Q. And the device that you have referred to as the Air-Maze device being sold at that time and manufactured under the Greene patent was exemplified by Exhibit 5 in this case?

(Testimony of Richard Spencer Farr.)

A. That is one of the styles that Air-Maze was selling at that time. Of course, they had many different panels which were being manufactured under the Greene patent. In all cases they were similar to that filter and varied only [286] in the amount of screen that was in the filter and the mesh of the screen that was in the filter. [287]

Mr. Leonard S. Lyon: Can I have Exhibit 1-A?

The Court: There is Exhibit 1-A.

By Mr. Leonard S. Lyon:

Q. Commencing at page 15 of Exhibit 1-A is a document entitled, "Affidavit under Rule 76," which was filed in the Patent Office in connection with the application of the patent in suit, and this affidavit is executed by Richard S. Farr on the 16th day of November, 1940. Is that your affidavit?

A. Yes.

Q. As Exhibit C to this affidavit is a catalog of the Air-Maze Company. I ask you if that is a catalog published by the Air-Maze Company at the time it was selling devices like Exhibit 5, showing you Exhibit 5.      A. Yes.

Mr. Baldwin: Your Honor, I think that is a conclusion that is not justified in the groundwork. In other words, this exhibit was filed years ago. Exhibit 5 probably was not around at that time. There has certainly been no identification shown between Exhibit 5 and this Exhibit C of this old file wrapper.

Mr. Leonard S. Lyon: I asked if this catalog describes the filter of the type that was exemplified here by Exhibit 5.

(Testimony of Richard Spencer Farr.)

The Witness: This information here doesn't give any great description about the filter, although it does refer [288] to Type B filters in here.

By Mr. Leonard S. Lyon:

Q. And Exhibit 5 is an Air-Maze Type B filter?

A. That is what the name plate states on it, and I have always assumed that that was a type B filter.

Q. Is that the type of device you were referring to in your affidavit? A. Yes.

Q. Now, commencing at page 34 of Exhibit 1-B is an illustration of certain test apparatus, and at page 36 is a comparative curve. These are referred to in your affidavit and I will ask you what is the test apparatus shown on page 34.

A. That was the test apparatus that we were using at that period for testing and reading air filters.

Q. As compared with the present apparatus that you use, is it qualitatively the same?

A. Well, it is on the same principle. It doesn't have nearly the refinements that our present test set has and, of course, it probably didn't give as good results. They probably were comparative results rather than qualitative results.

Q. But qualitatively, they are the same?

A. Qualitatively, yes.

The Court: On pages 36 it says, "(1) Temper- atair." Is that yours?

The Witness: That was our filter. [289]

The Court: The way you used it, then?

(Testimony of Richard Spencer Farr.)

The Witness: Yes.

The Court: Then, "(2) Air Maize Type B" and "(3) Detroit Filter," made out of paper.

The Witness: Yes.

Mr. Leonard S. Lyon:

Q. This set of curves on page 36, are they curves showing the results actually obtained in testing those three comparatively?

Mr. Harris: I object. There is no foundation testimony for that.

The Court: If you know.

Mr. Leonard S. Lyon: Read the question.

(The question referred to was read by the reporter as follows:

("Q. This set of curves on page 36, are they curves showing the results actually obtained in testing those three comparatively?")

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Are you familiar with those tests at the time they were made? A. Yes.

Q. Did you participate in and direct those tests?

A. Yes, I probably performed them myself or they were [290] under my direct supervision at that time.

Q. Now, will you refer to the curves on page 36 and point out to the Court the significant things that are revealed by those curves?

A. Well, Your Honor, the top three curves are the efficiency curves of the various filters, and the



(Testimony of Richard Spencer Farr.)

bottom three curves are the pressure drop curves of the filters.

No. 1 in each case is the Farr filter.

No. 2 in each case is the Type B filter.

No. 3 is the Detroit filter.

The efficiency curve on the Farr filter shows, to start out with, about 98½ per cent, and decreased down to about 92 per cent of the gentle slope. At the same time, the pressure drop on the Farr filter started in at 4/100 of an inch and raised to about 6/100 of an inch, with a dust load of 16 ounces.

These curves, incidentally, although it does not show on the sheet, were all run at 800 CFM.

The second curve shows the Type B Air-Maze filter, showing a slightly lower efficiency and the static pressure curve has been shown in the curves that Mr. Duncan presented, where the static pressure, after it received a certain amount of dust or dirt load, started to increase very rapidly.

The Court: From .04 up to .20? [291]

The Witness: To .20, .201—I guess it would be .21.

The Court: Yes.

The Witness: This photostat isn't too clear.

The third curve, showing the Detroit filter, shows a pressure drop curve that is higher by about 2/100 of an inch, higher than the Farr by about 2/100 of an inch, and following roughly parallel to the Farr filter.

The efficiency curve on the Detroit filter started at about 88 per cent, and after it had half a pound

(Testimony of Richard Spencer Farr.)

of dirt fed to the filter, it was at around 85 per cent.

The Court: Why did you stop that curve there at half a pound of dirt, and continue with the others? Why didn't you continue the test on that one?

The Witness: I can't recall why it was stopped at that point. We probably were interested in seeing the typical performance on it as relating to the basic differences in efficiencies, and on the particular test dusts that we were using with the efficiency being approximately 10 per cent less, we probably didn't run it out any further.

The Court: Was the same dust used in all of these?

The Witness: No, Your Honor.

The Court: In each one of the three?

The Witness: In each one of the three, the same dust.

The Court: That is what I mean.

The Witness: Yes, sir, the same dust, the same oil on [292] each of the metal filters. Again, on the paper filter, that undoubtedly was used as it was obtained, with the coating impregnated in the filter.

The Court: And with the same speed and quantity of the air?

The Witness: In this case, all three with the same quantity of air, the same velocity.

By Mr. Leonard S. Lyon:

Q. Now, in the text of your affidavit, commence-

(Testimony of Richard Spencer Farr.)

ing at page 16 of the exhibit, you stated to the Patent Office:

“The filter shown in the above-entitled Farr application and as shown in Exhibit A possesses the following outstanding characteristics:

“(1) Its efficiency in removing dust from aid is higher than any other tested air filter;

“(2) It has the property of maintaining a substantially uniform static pressure during use.”

Up to the time you first encountered the Air-Maze P-5 filter, had you ever found a filter manufactured by any other manufacturer than your company, that possessed those characteristics?       A. No.

Q. Now, when, for the first time, were you encountered in your sales efforts with a competitive filter possessing those characteristics? [293]

A. Well, the P-5 was encountered in about 1948.

Q. And was that the first device, competitive device, that you ever found in selling the Farr filter that possessed those characteristics?

A. Air-Maze had an earlier filter which they abandoned, that operated somewhat on the same basis, with similar performance characteristics.

Q. When was that?

A. I would say that was shortly after the war, maybe 1945 or '46.

Q. Did you testify as a witness in the case before Judge Yankwich tried on the Greene patent, in this court?       A. Yes.

Mr. Leonard S. Lyon: To fix the date of that

(Testimony of Richard Spencer Farr.)

trial, Your Honor, and to confirm my opening statement regarding Judge Yankwich's decision, I will at this time ask that there be made a part of the record in this case a copy of the order for judgment by Judge Yankwich in that case, dated May 15, 1943, and a copy of the findings of fact and conclusions of law entered in that case by Judge Yankwich on June 9, 1943. Of course, this Court will take judicial notice of its own records, but I think it is proper to have a particular part of the records of this Court that we want in this record received as part of the record in this case.

Mr. Harris: We have no objection, Your Honor.

The Court: Admitted in evidence.

The Clerk: No. 17, in two pieces.

Mr. Harris: Which is which?

The Court: Well, make it all in one. It is the findings of fact, conclusions of law, and judgment.

Mr. Leonard S. Lyon: Order for the judgment.

The Court: Order for the judgment?

Mr. Leonard S. Lyon: Yes. That is something in the nature of an opinion by Judge Yankwich.

(The documents referred to were marked Plaintiff's Exhibit No. 17 and received in evidence.)

[Printer's Note: Plaintiff's Exhibit 17 is reproduced in Book of Exhibits.]

The Court: Is there a judgment?

Mr. Leonard S. Lyon: Yes, there is a judgment.

The Court: Is the judgment there?

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: It is not there, but I think we should get the judgment, and I will, and have that added to the record.

The Court: Well, if you are relying on the doctrine of *res judicata*, you should have the judgment.

Mr. Leonard S. Lyon: I think we will, and we should, too, Your Honor.

The Court: And you probably should have the pleadings.

The Clerk: No. 17.

The Court: All right. When that is obtained, it may be attached to this exhibit. [295]

Mr. Leonard S. Lyon: Yes.

Q. Reference has been made, Mr. Farr, to the air flow rating which you originally operated under or referred to in selling the first of the Farr filters of the patent in suit. What was that rating?

A. 800 CFM for a 20 by 20 panel.

Q. Why did you employ that rating in your early sales of the Farr filter of the patent in suit?

A. We were in the position of a new company just starting out and we, of course, published our data on what was then considered standard rating. We had the problem of selling customers filters that were interchangeable, we will say, with the filters that were being used at that time.

Of course, in our test work we soon found that our filter could operate at these higher velocities, and while we still published and used that data, the 800 CFM, for a short period of time, we were promoting and selling the outstanding features of the

(Testimony of Richard Spencer Farr.)

filter such as its higher efficiency and higher air-handling capacity.

Q. And when, about, did you begin emphasizing the higher air-handling efficiency of your filter?

A. I don't recall when that would reflect in our literature, but it was almost at the time that we brought out our filter that we started selling them at the higher air-handling capacity. [296]

Q. And was that higher air-handling capacity first provided by the filter of the patent in suit?

A. Well, the design features of our filter are such that it will handle 50 per cent more air than the then considered standard filters, and when I say handle that much more air, that is given it, delivering higher dust efficiencies, higher dust-holding capacity, and as low or lower pressure loss.

Q. When did you first encounter a filter, a competitive filter, in the trade which would meet that higher air-handling efficiency or capacity?

A. I believe I answered that question earlier, that that was in 1945 or 1946.

Q. And what filter was that?

A. That was the early P-5 which I understand has been abandoned.

Q. Will you describe for the Court the difference between that early P-5 abandoned filter and the current P-5 Air-Maze filter which is accused in this suit?

A. The early P-5 filter that we met in competition was a filter made of a series of layers of corrugated screen wire. The sheets of screen extend-

(Testimony of Richard Spencer Farr.)

ing in the general direction of the air flow through the panel, that of course is similar to the present P-5. The difference between the early P-5 and the later P-5 is that the channels are formed by the corrugations [297] on the sheets in the early P-5, and straight through the filter at an angle to the general direction of air flow, but had no change in that system.

The Court: No zigzag?

The Witness: Having no zigzag.

The Court: It was straight but angular?

The Witness: Straight, yes.

By Mr. Leonard S. Lyon:

Q. I show you Plaintiff's Exhibit 1-B in this case, which is a copy of the original filed application for the patent in suit, and particularly Fig. 3 of the drawings of that application. How does that device compare with this earlier abandoned Air-Maze filter which you have called attention to?

A. In appearance it is identical. There is the passage (indicating).

The Court: I see. [298]

Q. Mr. Farr, have you read over recently each of the statements made in your affidavit that you filed in the Patent Office in connection with the prosecution of the application of the patent in suit?

The Court: Read over what, his affidavit?

Mr. Leonard S. Lyon: Yes, each of the statements.

The Witness: Yes.

(Testimony of Richard Spencer Farr.)

By Mr. Leonard S. Lyon:

Q. And you have them currently in mind?

A. Yes.

Q. Are each of these statements true as of your present knowledge?

Mr. Baldwin: I object on the same ground that we objected to the introduction of Mr. Duncan's affidavit and not being caught short twice the same way I have all the matter underlined, if you want me to call attention to it.

The Court: Very well.

Mr. Baldwin: On page 16 of the file wrapper the statement up near the top of the sheet read a little while ago: "Its efficiency in moving dust from air is higher than any other tested air filter."

Then near the bottom of the sheet: "The ability of the filter of the above-entitled application to maintain a high filtering efficiency over an extended range of dust load without exhibiting a rapid increase in static pressure is in [299] applicant's experience entirely unique in the art."

On page 17, in the middle of the page: "Previous to the invention of the air filter of the above-entitled Farr application, all air filters intended to remove dust from air by employing the property of wire mesh to retain dust particles on impingement of the particles there against were constructed with the plane of the wire mesh at right angles to the intended direction of passage of the air through the filter panel."



(Testimony of Richard Spencer Farr.)

On page 20, the middle of the page, where the numbers are marked in quotes, the sentence beginning: "By comparing curve marked '1' with those marked '2,' it will be seen that the air filter of the above-entitled application possesses throughout an extended variation of dust load a high filtering efficiency," and so on.

Then on page 21, the last sentence of the first paragraph: "The result is that a substantial portion of the dust is carried through the filter by large streams of air which are not effectively impinged against the surface of the filter, and accordingly the paper is not effective in removing dust from air."

And in the next paragraph: "Affiant has tested air filter panels employing and constructed with herringbone corrugated paper, the paper employed being Detroit filter paper of a type specially designed for maximum absorption qualities. [300] Such a filter when tested gave the results indicated by the curves marked '3' on the chart, which is 'Exhibit E' to this affidavit."

Then on the top of the next page: "the filter efficiency of a filter construction of paper is markedly below that of filters constructed with wire mesh screen."

Then there are certain statements about the St. Cyr patent in the last paragraph of his affidavit.

There is no foundation, we believe, for any of those statements related in this affidavit and therefore its reproduction in toto is not admissible.

(Testimony of Richard Spencer Farr.)

The Court: On page 16 it appears to me that both of those statements are expressions of opinion of the witness, and they are offered as expert testimony of this witness, is that correct?

Mr. Leonard S. Lyon: That is correct.

The Court: That seems to me to be true of all of the other statements as you have called my attention to them.

Mr. Leonard S. Lyon: I might state, Your Honor, on those matters of opinion, it is not uncommon at all, and it has happened in this district on several occasions in my experience, that the judges have asked that the expert witness, expert affidavit of witnesses as far as they express opinion, that the direct examination be put in affidavit form and read in affidavit form and that counsel be advised of them [301] in advance and that they just come in and cross-examine the witness.

We did that with Judge Bledsoe in a case I know.

Mr. Harris: That was the old equity rules.

Mr. Leonard S. Lyon: It was actually a practice under the old equity rules, that you could make a motion and require that the expert witness' statement of opinion be in affidavit form.

The Court: I suppose you can do it now under pretrial.

Mr. Leonard S. Lyon: I haven't any objection to going through these if Your Honor thinks it is necessary.

The Court: The objection is overruled. I will read the affidavit as I have read Mr. Duncan's affidavit.

(Testimony of Richard Spencer Farr.)

Mr. Baldwin: May there be an exception to the part I read from page 17?

The Court: That is what he said about the other filters?

Mr. Baldwin: About all filters.

The Court: Again that goes to the weight of his testimony. I can decide that whether or not there is a conflict. I have to decide it anyhow. That is what he thinks.

So the objection is overruled.

By Mr. Leonard S. Lyon:

Q. Will you answer the question?

A. If I remember the question right, I was asked if I [302] am still of the same opinion now as I was and so showed in that affidavit. Is that correct?

A. I am asking if you are familiar with each of the statements you made in that affidavit and if you state that each of those statements is true as of your present knowledge and opinion.

A. Yes.

Q. Will you refer to Exhibits 7, F and H?

(The exhibits referred to were passed to the witness.)

By Mr. Leonard S. Lyon:

Q. Are these three specimens of bulletins issued by you as sales aids in promoting the sale of the filters manufactured under the patent in suit?

A. Yes.

Q. Are they representative of a number of other

(Testimony of Richard Spencer Farr.)

issues of the same bulletins? I mean, these are three of a series, are they not?      A. Yes. —

Q. About how many different bulletins have you issued since 1940?

A. Probably in the order of 30 or 40 as far as different sheets go.

The Court: Do you want to put them all in?

Mr. Leonard S. Lyon: If counsel for the other side sees any point in it, I will get a specimen of each one of [303] them.

Mr. Harris: I don't see any point in them, Your Honor.

The Court: Very well.

By Mr. Leonard S. Lyon:

Q. Which one of these was the earliest?

A. This bulletin F-161 was the earliest of these three.

Q. Can you give us the period of time during which that bulletin was in current use?

A. Probably that was published in about '40 and used maybe until '41, '42. I don't see any date on this.

Q. When was Exhibit F in current use?

A. That was probably published in '43—no, I am wrong—that might have been a reprint. I don't know exactly the date on this.

Q. Approximately when?

A. Approximately '45, say.

Q. And will you refer to the figure 3 in that bulletin, entitled "Typical Application of Air Filters to Unit Type Equipment," and explain the significance of that figure?

(Testimony of Richard Spencer Farr.)

A. The significance of this illustration here was the very thing that we had to sell in our filter, which was one of the characteristics performances of our filter, where we could operate the unit at higher velocity than was then considered standard. [304]

The practice at that time in applying filters ahead of a coil, for example, was to put a V bank in to get enough filter area to handle the air for the coil.

The Court: Or an increased load of air?

The Witness: Yes, or a slat filter to increase the area, because the coils were operating at around maybe 800 or 600 feet a minute face and then standard filters were around 300 feet a minute face velocity.

So with the filters that were in competition at that time they had to increase the area which these illustrated common methods that were used.

The Court: Staggering them?

The Witness: Yes, to increase the filter area.

And the one on the right where it says "equal area Far-Air filters," is an illustration of how space could be saved and the installation made more compact by using the Farr filter with its unique performance at high air handling capacity in equal area to the coil.

By Mr. Leonard S. Lyon:

Q. Will you refer now to Exhibit 7. Is that your current bulletin being employed at this time?

A. Yes, sir. This bulletin has just recently been published.

(Testimony of Richard Spencer Farr.)

Q. First with respect to Exhibit 7, can you give us in round figures the number of these bulletins that have been [305] sent out to the trade?

A. I don't know whether they have actually been sent out now or they may go out soon. In any event, probably 10,000 to 15,000 have either been mailed out or will be mailed out in the next day or two.

The Court: They go to architects, engineers, designers, construction firms?

The Witness: Yes, Your Honor.

By Mr. Leonard S. Lyon:

Q. And customers such as railroads?

A. Yes.

Q. And airplane companies?      A. Yes.

Q. And like that?

A. Yes, any technical group that have to do with the design and application of air filter banks.

Q. On the inside cover of Exhibit 7 is a list of users of the Far-Air filters. Are those all users of the air filter like Exhibit 2 manufactured under the patent in suit?      A. Yes.

Q. And those are just a few of the names of various companies?

A. Yes. You will note there are no railroads listed in this group at all.

Q. Why is that? [306]

A. Well, we send out a different type of catalog to the railroads and this is more or less for the trade that are the architects and engineers designing stationary ventilation systems such as in this building here.

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

The Court: Do you make and sell them also for diesel motors?

The Witness: Yes, Your Honor.

The Court: For carburetors on gasoline internal combustion motors?

The Witness: On some large engines we don't make them for the small engines such as a horsepower of 100 for an automobile. Most of our sales are to large horsepower units in the neighborhood of maybe several hundred horsepower up to 2000 horsepower.

The Court: Such as railroad diesels?

The Witness: Yes, Your Honor.

At the present time a good portion of our manufacturing capacity is supplying the diesel locomotive manufacturers with filters for their engines and their air cleaning on their diesel electric units. By Mr. Leonard S. Lyon:

Q. Where used with engines, are they located between the carburetor and the engine?

A. On the diesel engines they are located on the air [307] intake. Most of our modern-day diesels are supercharged and the filter box which holds the filter panel is set on the inlet to the blower which may either be a Roots type blower or a supercharger.

Q. That means that they take air direct from the atmosphere and pass it into the engine system?

A. Yes, sir.

Q. Are your filters adapted for use between a carburetor and the engine to function in conjunction with the gas mixture?

(Testimony of Richard Spencer Farr.)

A. No, we have never made such an application and never considered one.

Q. Would such a device be an air filter of the type we are considering here?      A. No.

The Court: It would be a gasoline filter, would it not?

Mr. Leonard S. Lyon: Yes.

The Witness: I don't know what it would be used for there.

By Mr. Leonard S. Lyon:

Q. Now I show you Plaintiff's Exhibit No. 8. Is that a current bulletin that you are issuing to the trade at the present time?

A. Yes. This is another thing that we just published and are sending out to architects and engineers and users [308] all over the United States and Canada.

Q. How many of those have been published?

A. Well, there have been printed and sent out or will be in the next few days a total of 14,000 or 15,000.

Q. And is that a rewrite of earlier bulletins describing your testing methods that you have issued to the trade?

A. This is a summation of our past experience in the development of testing system outlining our present test methods, giving pictures and history on the development, past experience, and of course our present device.

Q. Now in this test method or by this test method that you describe in this bulletin you pro-



(Testimony of Richard Spencer Farr.)

duce curves of the kind that have been shown to the Court here by Mr. Duncan?      A. Yes.

Q. Prior to your going into the filter business or prior to your first attempt at selling of the patented filter, were other manufacturers promoting the sale of their filters by using these comparable curves showing efficiency of their filter and the pressure drop at the filter?

Mr. Baldwin: I object on the ground that there is no foundation. I believe he has testified that from the time he started in with this company in the making of these filters he hasn't shown that he had any knowledge of the time before that as to what other people were doing.

The Court: He is asking him now only about the time he [309] started to make them.

Mr. Baldwin: He has been asked about the time before he started making them and there is no testimony that he knows anything before that time because they have been making them ever since he started to work.

The Court: I thought his question was limited to the time he started.

Mr. Leonard S. Lyon: Yes, when he started. My question is intended to bring this out, whether the use of these kind of curves was something these people have developed or whether he found them already being used when he started in his sales activities.

The Court: The objection is overruled.

The Witness: When I first saw other types of

(Testimony of Richard Spencer Farr.)

published literature on the sale of filters, the curves then generally shown were those illustrated in Graph 3 in Exhibit 7, with this exception, there were no attempts in any of the curves that I ever saw to clarify or classify what type of dust was being used in the test. It was common practice at that time to just show an efficiency curve, a pressure drop curve and state practical dust without any clarification as to what practical dust meant.

One of the purposes of this technical report is to show the effect of the filter performance as tied in to particle size, which is a very important thing in air cleaning. [310]

The Court: Did you introduce anything into literature on the subject, on the matter of disclosing type of dust that you used?

The Witness: In our early stages?

The Court: Yes, or at any time during the course of your business.

The Witness: Yes. Always our practice has been to state what the chemical composition of the dust was and the particle size analysis of the dust. I believe that we are the first company to publish results in that fashion.

The Court: All right.

By Mr. Leonard S. Lyon:

Q. I show you Exhibit No. 2, which is a 20-inch panel of the Farr patented air filter, and call your attention to the fact that impressed on the frame of that filter is the following: "Far-Air Filter, Patent No. 2,286,479. Others Pending. Serial No. 1151, Farr Company, L. A. Cal."

(Testimony of Richard Spencer Farr.)

Have you marked all such panels that have been manufactured like Exhibit 2, with this patent notice? I mean by "manufactured" those manufactured and sold by you since the issuance of the patent in suit.

A. To the best of my knowledge, since we were granted our patent, we started putting the patent number on our filters.

The Court: And you continued to do so? [311]

The Witness: Up to the present time. [312]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Mr. Farr, you referred to the fact that your company issued a special bulletin to railroad companies. I hand you a copy and ask you if you will identify the same.

The Clerk: Marked, first, No. 18.

(The document referred to was marked Plaintiff's Exhibit No. 18 for identification.)

A. Yes. This is our folder on railroad products.  
By Mr. Leonard S. Lyon:

Q. This is the folder that you distribute to the railroad companies, as a sales aid of your patented filters to the railroad companies? A. Yes.

Mr. Leonard S. Lyon: I will ask that it be received in evidence as Plaintiff's Exhibit No. 18.

The Court: Admitted.

(The document referred to, marked Plaintiff's Exhibit No. 18, was received in evidence.)

(Testimony of Richard Spencer Farr.)

The Court: These designs illustrated are made in the same fashion, except for the change in style and the protecting cover?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Are you familiar with the curves produced by Mr. Duncan, which are on the sheet constituting Plaintiff's Exhibit 11 in this case?

A. Yes, I am.

Q. Attention has been drawn to the fact that the curves for the Farr device and the Air-Maze Type B device are approximately parallel on this exhibit up to a dust load of 500 grams. Attention has been called to the fact that above 500 grams the pressure drop rises abruptly.

Based on your experience in the practical uses of this device, what is the fact or what is the objection, from a practical standpoint, to a filter that, after reaching a certain dust load, rises abruptly in pressure drop?

A. In a ventilating system such as we have here in this court room, the whole system is sized for a given pressure [319] loss, a certain pressure loss for the filter, a certain pressure loss for the heating coils, the cooling coils, the duct work and the outlet registers. After that pressure loss is determined, then a fan is selected to move the desired quantity of air against this pressure loss. That is how we determine how much air is going to come into this room and the temperature of the air.

A rapid change in pressure loss, such as shown

(Testimony of Richard Spencer Farr.)

in this Exhibit 11 on the Type B Air-Maze, after it has picked up about 500 grams of dirt, would materially unbalance such a system, and the detriment in unbalancing such a system means that we do not get the amount of air that this room calls for or was originally designed for, and if we are on a cooling cycle and dropping the air quantity down, due to the sharp increase in resistance, we may drop the temperature of the air where, instead of bringing in maybe 50 degrees for cooling on a hot day, we might drop it down to 45 degrees, which again unbalances the system, and that is the detriment in the ventilating system for this rapid change in pressure loss.

In an engine, such as the applications we make these units for in this Exhibit 18, the detriment there is, an engine burns fuel and air, the oxygen and air in the filter changes materially in pressure loss on an engine intake and can cause a decrease in horsepower due to the fact that the [320] engine does not get enough air to burn with the fuel and develop the horsepower that it is rated for.

In the case of the Diesel engine, not only will it drop off in horsepower but, because the fuel rack setting is fixed, the engine will start to smoke badly due to lack of sufficient combustion air.

In a heating system such as a furnace for a home, a detriment in a rapid change in pressure loss is that that home is usually designed to handle a certain amount of air to carry away the heat that is generated in the fire box. If the filter changes

(Testimony of Richard Spencer Farr.)

rapidly in pressure drop and decreases that amount of air, the fire box overheats, and there has to either be a thermostat where you can shut the thermostat off, or it will actually burn out the fire box due to starvation of air over the heat-transfer surfaces.

In all three of those examples it is very essential that a filter does not have that rapid change in pressure loss, or if one is used that has such a rapid change in pressure loss, that its life is chopped off before it goes to this point where there is a rapid change. [321]

Q. Now it has been suggested or inferred that the pressure drop above 500 grams dust load indicated on Exhibit 11 in the case of the Air-Maze filter would be immaterial because the device would be changed after it had been loaded up to 500 grams. What have you to say as to that?

A. When the filters are serviced the human element enters into that. For example, we in this curve show a dust holding capacity on the Farr filter at 1000 grams. As an example, I have seen diesel electric units come in that have been out on the road where they haven't been able to service them with as much as 14 pounds of dirt on a single 20 x 20 filter.

That is true of many applications, especially on motive equipment where maybe they run into dust storms and can't change them. They have nothing to change them with.

So you can't say that the filter will always be changed at a certain dust holding capacity or a

(Testimony of Richard Spencer Farr.)

certain point. That may be possible in stationary systems, but even that is highly variable in such an installation as we have here.

The Court: In this building?

The Witness: In this building.

The Court: Or a typical building?

The Witness: Yes, because maybe the building engineer says he is going to change filters every 30 days, which his past experience has shown him is correct, but if we have a [322] dust storm, a "Santa Ana," maybe he should go down and change it that very afternoon, and if he doesn't do it, up goes the pressure drop.

Mr. Leonard S. Lyon: You may cross-examine.

### Cross-Examination

By Mr. Baldwin:

Q. Just for the record, Mr. Farr, I would like to state my understanding of the history of the Farr Company as an entity.

It is my understanding that it was originally a partnership, then became a corporation Tempered Air, Inc., and is now the Farr Company, is that correct.      A. Yes.

Q. You mentioned in your direct examination what I believe you called "an early P-5" model of the Air-Maze Corporation product. I call your attention to Defendants' Exhibit A and ask you if that represents the early P-5 you were speaking of.

A. (Examining exhibit) Yes, this is the one I was referring to.

(Testimony of Richard Spencer Farr.)

The Court: That is the abandoned model?

Mr. Baldwin: Yes, sir.

Q. You have stated that you are familiar with the details of the testing procedure used by the Farr Company. That is correct, is it not? [323]

A. Yes, sir.

Q. Do you know the density or weight of your test dust in your composite dust 1543094 in grams per cubic centimeter?

A. Grams per cubic centimeter? That is the same as specific gravity?

Q. There is a difference, but whatever way you know.

A. I know the specific gravity is about 2.5.

Q. Do you know of any other filter manufacturer who is now using the same test dust for testing filter panels which your company uses?

A. I believe the American Air Filter performed some tests with Arizona road dust, or this U. S. standardized test dust.

Q. But they do not regularly test their panels with that dust, do they?

A. No, I don't believe they do.

Q. Do you know of any other?

A. No, I don't believe I can think of any other.

Q. Referring to Plaintiff's Exhibit 8, which is your technical bulletin—I don't think you are going to need one but——

Mr. Leonard S. Lyon: I have one here.

(The exhibit referred to was passed to the witness.)



(Testimony of Richard Spencer Farr.)

The Witness: What figure did you refer to?

Mr. Baldwin: Graph 1. [324]

Q. I think the bulletin is clear, but it is true, is it not, that that test data is made by using your dust No. 1543094?

A. If that is the standard United States Army fine dust—I don't recall the number exactly—but if that is the United States standardized Army fine dust, that is what we refer to in this test.

Q. If you will turn to the second page in front of the one the graph is on, the column headed at the top "Quantitative filter test method with classified dust," and refer to the paragraph beginning in the middle of the page, I think that that identifies it.

A. (Examining exhibit) Yes.

Q. And that is the same dust which was used in Plaintiff's Exhibit 11 which you just looked at a moment ago?

A. Yes.

Q. And Plaintiff's Exhibit 13, which is a comparison, identified by Mr. Duncan and of the P-5 and the Farr filters?

A. Yes.

Q. Referring to Graph 3 on the next page of that bulletin, do you know the specific gravity of the dust used to produce that curve?

A. That is 2.5 again. Actually, the dust used in Graph 3 is a dust that is classified out of the composite dust by means of a Federal classifier. [325]

Q. Yes, I understand.

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

Q. Your answer meant, as I interpret it, that if the pressure drop should rise suddenly as shown in Plaintiff's Exhibit 11 that that would seriously unbalance the system, is that right?

A. I pointed out, Mr. Baldwin, that a rapid change in pressure loss, such as shown in this curve, could seriously unbalance the system. [326]

I think it should be qualified to this extent, that the magnitude of the pressure drop as compared to the overall pressure loss of the system determines how much unbalance exists.

For example, this system right here might have an overall pressure, static pressure, load of an inch or an inch and a quarter of water. Consequently, three-tenths of an inch or four-tenths of an inch is an important percentage of the overall pressure loss and that would seriously unbalance it.

If we happened to have a system that had an overall pressure loss of 5 inches of water, then a pressure loss difference of one-tenth or two-tenths or three-tenths of an inch might not seriously unbalance that.

Q. Isn't it true, in a building the size of this one, that that overall static pressure is quite considerable with the long ducts?

A. I would judge that this system is operating probably on a total pressure loss of an inch and a half of water, maybe one and three-quarters.

A. And from your knowledge of air conditioning installations, wouldn't you presume that that

(Testimony of Richard Spencer Farr.)

installation was made to accommodate the filter with a .5 inch of water pressure drop?

A. That is entirely up to the designing engineer, Mr. Baldwin. In many cases the engineer allows enough static [327] pressure for maybe just one-tenth or two-tenths of an inch. I think the most common practice is around two-tenths to a quarter of an inch. That of course depends on the selection of the filter that the engineer makes.

Q. It is true, isn't it, that the ASH and VE code adopted in 1933 sets .5 inches of water as the borderline between the low resistance and high resistance filters of this type?

A. I would have to refresh my memory by reading that code to be able to answer that question.

The Court: Of which type? You say "of this type."

Mr. Baldwin: The filter panels intended for general air conditioning units.

The Court: What is the ASH and VE code?

Mr. Baldwin: That is the American Society of Heating and Ventilating Engineers, to which all of these filter manufacturers belong.

The Court: It is a private organization?

Mr. Baldwin: That is correct.

That is all.

Mr. Leonard S. Lyon: That is all, Mr. Farr.

The Court: Step down. [328]

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

MORRILL SPENCER FARR

called as a witness by and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Morrill, M-o-r-r-i-l-l, Spencer, Farr.

The Clerk: Your address, please?

The Witness: 7120 Arizona Avenue, Los Angeles 45.

Direct Examination

By Mr. Leonard S. Lyon:

Q. You are a brother of Richard Farr, the previous witness in this case?      A. I am.

Q. How old are you, Mr. Farr?

A. Forty-one.

Q. What is your occupation?

A. I am secretary and treasurer and general manager of Farr Company.

Q. The plaintiff in this case?

A. That is correct.

Q. How long have you been connected with the Farr Company?

A. Since the beginning in July, 1937. [333]

Q. Were you one of the organizers of that company?      A. Yes, sir.

Q. When was it organized?

A. July 1, 1937.

Q. How much of a company was it when you started?

(Testimony of Richard Spencer Farr.)

A. The company had rather a meager start. At that time Dad and Dick and myself started into the business with an idea of manufacturing some air conditioning equipment. Neither one of us had had any prior experience in that field or allied fields so that seemed about to be as tough a job as anything else, so we decided to build some units of that type.

For the first two or three years of course most of the time was devoted to test and development to see if we could find something that was satisfactory to bring on the market. As a matter of fact, for the first four years our sales were based—well, they were based almost completely on what sales we got in the evaporative cooling field. That was a pretty seasonal job because in the evaporative cooling field such equipment that is used in the desert regions are installed mostly during the summer season.

The Court: That is these little units you see stuck on top of the buildings?

The Witness: That is right.

The Court: Such as you see in Fresno or Palm Springs?

The Witness: Yes, sir. [334]

In 1939, after we had had some experience with this evaporative cooling, we got the idea of building an air filter based on somewhat the same principle of the cooler.

That was again a case of doing considerable experimental work to determine what we felt was the best design for such an item.

(Testimony of Richard Spencer Farr.)

The year previous to the time that the filter was brought out was spent pretty much in test and development. Our filters were first initiated or started in the market in 1940. Of course that also was a new field to us. We were just barely getting started in the evaporative cooling field and the filter field being new, that likewise like any other product, it takes a lot of work and effort to get anything started. [335]

By Mr. Leonard S. Lyon:

Q. At the time you put out the first of the air filters did you have a factory?

A. Yes. We had a place of business, yes, sir.

Q. How many employees did you have?

A. When we started the cooler business there were just three of us, in 1937. I would say, by the time we started our first filter, that there were possibly five or six of us, back in 1939 and 1940.

Q. Now, you say you brought out the first filters, air filters, in 1940. Was that the filter like Exhibit 2 in this case, the patented filter?

A. That is our standard filter, yes, sir.

Q. And that is the device built under the patent in suit, the first device?

A. That is correct.

Q. And who designed this filter?

A. My father.

Q. That is, Morrill Farr, named in the patent in suit?

A. Correct. [336]

\* \* \* \* \*

The Court: You will stipulate to the assignment in due course?

(Testimony of Richard Spencer Farr.)

Mr. Harris: Yes.

Mr. Leonard S. Lyon: The assignment by Morrill N. Farr to the Farr Company, of which I have the original in my hand, is of the entire right, title, and interest in and to the letters patent in suit and is dated July 14, 1947.

Mr. Harris: We will so stipulate.

\* \* \* \* \*

Mr. Leonard S. Lyon: Will you proceed.

The Witness: Will you state the question again, sir?

(The question referred to was read by the reporter as follows:

“Q. Now, will you give us an outline of what progress you made——”) [337]

By Mr. Leonard S. Lyon:

Q. (Continuing) ——in the sale, promotion, and manufacture of the air filter panel of the patent in suit?

A. Well, starting with the early part of 1940, when we started putting these filters on the market, as I stated, we had approximately five or six employees and perhaps 2500 square feet of floor space. We had depended and were depending at that time largely on the sale of our evaporative cooler for our income. That was true up through the year 1942.

In 1941, not having gotten far in the establishment of our name in the air filter field, we had the choice of trying to divert our sales, or get our sales, perhaps I should say, either from the defense plants

(Testimony of Richard Spencer Farr.)

that were being organized and built at that time, or getting into a completely new industry, because, of course, our evaporative cooler, which was and is made of copper and brass products, was getting to the point, due to the controlled materials plan, where we could not produce any more of those.

As a result, we decided to go after the aircraft engine application. That was becoming a problem at that time, when the airplanes were operating from unsurfaced fields and they were getting so much dust in the engines that the engine life was in some instances practically negligible.

We got approval from Wright Field late in 1941. We were at that time, as I recollect, one of three manufacturers [338] whose products were accepted for that application.

And in 1942 we got our first contracts from the aircraft companies, for the manufacture of such an air filter. At that time we probably had in the neighborhood of 12 or 13 employees and still our 2500 square feet of floor space.

During the war years all of our production was devoted to government work. I say all of it. 95 per cent of it, anyway, the bulk of it, of course, going to the airplane industry, and then the armed forces, the Army, Navy, and Maritime Commission.

We, finally, toward the end of the war, in January of 1945, were awarded an Army-Navy E for our work in the defense effort.

At the time the award was given to us, they made the comment that we were the smallest plant in the



(Testimony of Richard Spencer Farr.)

11 Western States that had received the award up to that time, at which time we had approximaely 40 employees.

Q. Was your only product at that time the patented air filter here in question?

A. That is correct.

Prior to the war period we started doing some test work in connection with the railroads for possible application of our filter.

Durig the war we carried on as much test work as was permissible under the requirements that there were then to [339] divert everything into the war effort.

When the war was about to come to an end, we were fortunate enough to get an order from one of the large railroads to change over all of the filtering equipment on their Diesel locomotives, to replace filters that were then on their locomotives, with our product. Along with this, we had found, in inspecting this field, that there were quite anumber of different sizes of filters and holders for the railroads, and so, when we got into the field, we concluded that we could be of the best service to the railroad industry by standardizing on as few sizes as possible, and we have since that time standardized about three sizes of filters in place of however many they had formerly.

The Court: How many did they have?

The Witness: I don't know how many. Various sizes. There were anywhere from 10 to 30 to 40, I suppose, Your Honor.

(Testimony of Richard Spencer Farr.)

We were very fortunate, indeed, of course, in getting this order from the railroad company to make this changeover, because it enabled us to switch over from war production to civilian production without too much difficulty.

In our year ending 1945, for example, we were perhaps 90 per cent government work, and in the following year we were 90 per cent civilian work. So we were indeed fortunate that we had that contract to tide us over. [340]

During the war period we also, insofar as was possible, endeavored to set up sales representatives throughout the country so that we would have someone to sell our product throughout the United States when the material situation would enable us to do so.

In 1946 we brought out another product which is right alongside the filter. It incorporates the use of our filter, and we made a bid to get into the self-washing filter field, where wire filters are automatically cleaned and re-oiled, which eliminates to a great extent the service problem on air filters.

About that same time we also developed, at the request of one of the railroads, some servicing equipment to handle these panel filters.

It has been mentioned several times in the testimony that fuel filters may need to be cleaned anywhere between three days and three months.

The Court: I thought the witness said "four hours" in packing plants.

The Witness: I shouldn't at all be surprised.

(Testimony of Richard Spencer Farr.)

We were requested to develop washing and oiling equipment that would service these filters.

The Court: In their frames?

The Witness: No. In that case the filters are removed from their holder frames and taken over to be serviced. [341]

The Court: You referred to the automatic washer and oiler.

The Witness: I probably used the wrong terminology. We call it a self-washing filter, which is constructed of a number of these 20 by 20 panels, constructed in a sheet metal frame, and then, through oiling and watering devices, they are controlled through a time clock and automatically cleaned.

The Court: And cleaned in place?

The Witness: And cleaned in place.

The Court: And oiled in place?

The Witness: That is correct.

The Court: Excuse me for interrupting your train of thought.

The Witness: Thank you for clarifying that.

The oiler thing I am referring to is the actual equipment that services your standard fuel filters.

And we brought out some equipment that reduced the cost of servicing and re-oiling filters by approximately 60 to 70 per cent of what costs formerly had been when they were doing it manually.

In 1947 we had gotten fairly well established in the railroad industry and had the good fortune of having a number of the railroads specify our prod-

(Testimony of Richard Spencer Farr.)

ucts with the Diesel locomotive manufacturers and we started to get a fair amount of business from the Diesel locomotive manufacturers. [342]

Our sales continued to grow, having dropped off the two years right after the war, and then resumed again in 1947 and '48.

By Mr. Leonard S. Lyon:

Q. Have you prepared a graph showing, in dollar volume, your sales of the patented air filter involved in this case, by years, commencing in 1940, running through to the 1st of October, 1951?

A. I have, sir.

The Clerk: No. 23.

The Court: No. 23?

Mr. Harris: Do you have a copy of this, Mr. Lyon?

Mr. Leonard S. Lyon: Yes. (Hands document to Mr. Harris.)

I ask that this graph be marked for identification Plaintiff's Exhibit No. 22.

(The document referred to was marked

Plaintiff's Exhibit No. 22 for identification.)

By Mr. Leonard S. Lyon:

Q. Now, will you explain this graph and what you show by it?

A. Well, on this graph I have plotted the dollar sales volume commencing in 1940 and going through the years, including 1951.

Q. Will you give the totals by years as shown by this graph? [343]

A. I will have to try and do some rapid estimating here.

(Testimony of Richard Spencer Farr.)

In 1940, it was probably about \$500.

In 1941, it was a little more than that.

The Court: Well, each one of these squares represents \$40,000, doesn't it?

The Witness: Yes, each square is \$40,000, Your Honor.

The Court: Well, in 1942, it looks like it would be about \$20,000.

The Witness. About \$20,000.

In 1943, it looks about \$230,000.

In 1944, about \$520,000.

In 1945, \$420,000.

In 1946, about \$440,000.

In 1947, about \$570,000.

In 1948, approximately \$1,090,000 and something.

In 1949, \$1,290,000.

In 1950, \$1,320,000.

And in 1951, in the neighborhood of \$1,800,000.

The Court: That is a calendar year?

The Witness: That is a fiscal year, ending June 30th, Your Honor.

By Mr. Leonard S. Lyon:

Q. Now, as I total this, you have sold, from your first sale in 1940 up to the end of your fiscal year in June, 1951, [344] approximately seven and one-half million dollars worth of the patented filters, is that correct?

A. That is correct. It was slightly in excess of that.

Q. At the present time the plaintiff owns a factory in which these filters are made, is that correct?

(Testimony of Richard Spencer Farr.)

A. We just moved into a new factory. We are not the sole owners of it, Mr. Lyon.

Q. You are the sole occupants?            A. Yes.

Q. That factory is shown on the next to the last page of Exhibit No. 8, is it not?            A. Yes.

Q. How many employees do you now have, engaged in the manufacture of the patented filter?

A. In our total manufacture, which includes some of these evaporative coolers, we have, all told, approximately 150.

Q. And what percentage of your business is in the evaporative coolers?

A. Between 5 and 10 per cent.

Q. Is the rest of it in this patented filter?

A. That is correct.

The Court: I understood your testimony to be that you are gradually getting out of the evaporative cooler business.

The Witness: No, sir. We are doing as much in the [345] evaporative cooler field as we ever have done. As a matter of fact, it is increasing each year, but our filter sales have been going up, of course, at a much greater, rapid rate; and it assumes a smaller proportion.

By Mr. Leonard S. Lyon:

Q. Now, can you tell us in what geographical territory your cooler is actually sold and used, the patented cooler?

A. Our cooler is limited pretty much to the 11 Western States. It is an evaporative cooler.

The Court: Except for the railroads? Are you talking about the evaporative cooler?

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I should not be talking about the cooler. I am interested in the air filter.

Q. Will you answer the question with reference to the air filter?

A. I am sorry. I misunderstood your question.

The Court: He said "cooler."

Mr. Leonard S. Lyon: I made a mistake.

The Witness: The air filter is sold throughout all the states and in approximately 15 or 16 foreign countries.

By Mr. Leonard S. Lyon:

Q. Where do you have sales offices selling the patented air filter?

A. We have sales offices and warehouses in Chicago and [346] New York, and then, of course, we have our manufacturing and sales offices here. Other than those three locations, the filters are handled by manufacturers' agents who are strictly on a commission basis.

Q. Was there any application made for patents in foreign countries corresponding to the application for the patent in suit?

A. We had a patent issued in Canada and in Great Britain.

Q. On this filter? A. That is correct.

Q. I show you what purports to be a patent in Great Britain, No. 646,935, of 1950, which will be Exhibit No. 23.

The Clerk: Plaintiff's Exhibit No. 23.

(The document referred to was marked Plaintiff's Exhibit No. 23 for identification.)

(Testimony of Richard Spencer Farr.)

By Mr. Leonard S. Lyon:

Q. Is this the patent in England to which you have just referred?      A. Yes.

Q. I show you what purports to be Canadian Patent No. 471,516, issued February 13, 1951, which I will ask be marked Exhibit No. 24. Is this the patent to which you have just referred?

(The document referred to was marked Plaintiff's Exhibit No. 24 for identification.)

A. It is.

By Mr. Leonard S. Lyon:

Q. You referred to your cooler that you started to manufacture shortly before the first manufacture of your patented air filter. By whom was that cooler designed?      A. By my father.

Q. Did you apply for a patent on that cooler?

A. Yes.

Q. I show you Patent No. 2,286,480, granted June 16, 1942, to Morrill N. Farr, which I will ask be marked Exhibit No. 25, and ask you if that is the patent issued to your father on the evaporative cooler that you have been referring to in your testimony.      A. That is correct.

(Said document was marked Plaintiff's Exhibit No. 25 for identification.)

Mr. Leonard S. Lyon: You may cross-examine.

\* \* \* \* \*

Mr. Leonard S. Lyon: May the record show that Exhibit 22, the graph of the sales of the patented filter, Exhibit 23, the British patent, Exhibit 24,



(Testimony of Richard Spencer Farr.)

the Canadian patent, and Exhibit 25 the patent on the evaporative cooler, are in evidence, Your Honor?

The Court: Admitted.

(The documents referred to were received in evidence and marked Plaintiff's Exhibits Nos. 22, 23 and 24 and 25 respectively.)

The Court: Did you use the same system of filtering air in the evaporative coolers, the same device?

The Witness: No, they are two different items.

### Cross-Examination

By Mr. Harris:

Q. Mr. Farr, with regard to the sales chart, Exhibit 22, does that include these evaporative coolers as well as filter panels? A. No, sir.

The Court: The answer was no, sir?

The Witness: No, sir.

By Mr. Harris:

Q. Does that include sheet metal work for filter installations other than the filter panels themselves?

A. We don't make filter installations.

Q. Don't you sell brackets and frames for filters?

A. That is correct. That is filters and parts. The [349] graph so states.

Q. Those are not part of the filter?

A. I consider them part of the filters, being holding assemblies for filters.

(Testimony of Richard Spencer Farr.)

Q. They are holding assemblies for filters?

A. That is right. One couldn't be used without the other.

Q. What percentage of these filters is accounted for by such holding assemblies? Twenty-five per cent? Thirty per cent? A. Possibly.

Q. Now are these list figures or are they net figures to the Farr Company? A. Net figures.

Q. You have stated with regard to the evaporative cooler that is shown in Exhibit 25, the '480 patent, that it has some differences with respect to the Farr filter panels shown in the '479 patent in suit.

Will you tell the court what those differences are?

A. Did I state that there were differences?

Q. Well, perhaps I misunderstood you.

The Court: My question was whether or not you used the patent in suit filter in your—well, that is covered by the '480 patent. And your answer I understood to be, no, that they were a different construction. [350]

The Witness: They are two different products.

The Court: That is what he is asking you now. What is the difference?

By Mr. Harris:

Q. What are the differences?

A. The differences are that the cooler is used for lowering the temperature of air in your desert regions and is used for a cooling purpose.

Your air filter, of course, is used to remove dust or foreign particles from your airstream.

(Testimony of Richard Spencer Farr.)

The Court: What is the difference between the air filter and the cooler and the patent in suit? Or do you have an air filter in the cooler?

The Witness: No.

The Court: You do not have an air filter in the cooler?

The Witness: No, sir. They are different products. Sometimes they are used together.

By Mr. Harris:

Q. It is a matter of fact, is it not, Mr. Farr, that the evaporative cooler shown in the '480 patent operates as a very good air filter to remove dust from the air?

A. I don't know the answer to that, sir. [351]  
\* \* \* \* \*

Q. Is the same filter media used in the '480 patent as is used in the '479 patent in suit?

A. Screen cloth is used in both of them.

The Court: Is it constructed the same?

The Witness: Generally the same; yes.

By Mr. Harris:

Q. In the '480 patent do you have alternate flat and crimped layers of wire mesh screen?

A. Yes.

The Court: Is the air introduced parallel to them or across the surface of them?

The Witness: Parallel to the sheets of flat corrugated screen.

The Court: The same as is in the patent in suit?

The Witness: That is correct.

By Mr. Harris:

(Testimony of Richard Spencer Farr.)

Q. And the corrugations in the '480 patent are helical [352] corrugations, are they not?

A. That is true.

Q. So that they do bend and change direction from the inlet to the outlet faces?

A. I wouldn't think that they changed direction. They are corrugated at an angle on helical gears.

Q. But when they are wound and assembled in the unit shown in the '480 patent, those corrugations do take a helical path from the inlet to the outlet faces of the filter panel, do they not?

A. In the size of that rotor, it would hardly be described as helical. They are straight through corrugations at an angle.

Q. Can you see through them? A. Yes.

Q. When they are assembled? A. Yes.

Mr. Harris: We don't have one here in court but I think it is unnecessary to produce one.

The Court: Then if I understand it, the difference in structure is the filter in the '480 patent is in the—what do you call it—the Z-shape in the patent in suit, that is, the crimped wire is crimped and then bent in a Z-shape so that the air changes direction or provides a pathway for the air to change direction; whereas in the '480 they are crimped but [353] they are not convoluted or bent.

The Witness: It is a straight through crimp, Your Honor.

The Court: It is a straight through crimp?

The Witness: Yes.

(Testimony of Richard Spencer Farr.)

The Court: It is not a Z crimp?

The Witness: No, sir.

By Mr. Harris:

Q. So would you say that the only difference in construction between the two devices is that in the patent in suit there is a bend in the corrugation, whereas in the '480 patent there is not?

A. Perhaps that is the only difference.

The Court: And the fact that this is made round in circular layers, whereas in the patent in suit they are laid horizontally?

The Witness: In the patent in suit they are shown as horizontal layers.

By Mr. Harris:

Q. However, you make round filters of the same type filter medium as the patent in suit similar to Defendants' Exhibit D, do you not?

A. That is correct.

Q. And that embodies the same filter media as the patent in suit?      A. Yes. [354]

The Court: Then the filter used on the '480 is the same as Defendants' Exhibit D except that the wires are crimped straight across and not in a Z pattern?

The Witness: Yes. And the fact that on the evaporative cooler of course the screen is much deeper corrugations and is wound on a large hub.

Mr. Harris: Now, if the Court please, during the taking of depositions in this action we asked plaintiff's counsel to produce invoices and purchase orders for the first sales of filters of th type shown

(Testimony of Richard Spencer Farr.)

in the '479 patent in suit and also for the first invoices and purchase orders for the cooling devices or humidifiers shown in the '480 patent, which is Exhibit 25.

I have photostats of those here which plaintiff's counsel have provided to us and I wonder if we can't simplify the proof by a stipulation that these do illustrate the first sales of the '479 and '480 devices, the first commercial sales of those devices, which were made on or about the dates shown by invoices and purchase orders which I have.

Mr. Leonard S. Lyon: What are those dates?

Mr. Harris: Well, to identify them a little further and chronologically, the invoices and purchase orders on the '480 patent device, Plaintiff's Exhibit 25, that is, the first one I have here, is dated November 19, 1937, and bears invoice No. 45, being an M. N. Farr and Sons invoice indicating a [355] sale to Safeway Stores at 2522 Sunset Boulevard, Los Angeles.

Then there is a——

Mr. Leonard S. Lyon: Wait a minute.

Is that your invoice for the first sale?

Mr. Harris: This is the '480 patent.

Mr. Leonard S. Lyon: Of the evaporative cooler?

The Witness: Of the rotary as described in that bulletin.

Mr. Leonard S. Lyon: Of the what?

The Witness: I believe the question was of the type of rotor shown in that bulletin.

Mr. Leonard S. Lyon: What bulletin?

The Witness: A bulletin that was presented.

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. It is the type shown in the '480 patent, is it not?      A. Yes.

Mr. Leonard S. Lyon: This is the invoice for the first sale?

Mr. Harris: I had better show the witness these invoices.

Mr. Leonard S. Lyon: Yes. I want to stipulate to whatever I can but I want to be sure we are in accordance with the facts.

(Exhibiting document to the witness.)

The Witness: That is right. [356]

By Mr. Harris:

Q. Now the next——

Mr. Leonard S. Lyon: Wait a minute. What do we do about this first one?

Mr. Harris: Is there a stipulation that that was an actual sale on that date of the '480 device as shown by the invoice?

Mr. Leonard S. Lyon: That is correct.

And is that the first sale?

The Witness: That is correct.

Mr. Leonard S. Lyon: As shown by your books?

The Witness: That is correct.

The Court: That is the first sale of the cooler?

Mr. Leonard S. Lyon: Yes.

The Court: Of the '480 patent?

Mr. Leonard S. Lyon: Yes.

And that was on what date, Mr. Farr?

The Witness: 11-19-37.

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. November 19, 1937?                      A. Yes.

Mr. Leonard S. Lyon: Now shall we put that in evidence?

The Clerk: Do you want to mark that as an exhibit?

Mr. Harris: I have them all attached together. I will merely identify them and then maybe we can have a stipulation [357] that the documents show the sales.

Mr. Leonard S. Lyon: If the witness says so, I will so stipulate.

By Mr. Harris:

Q. The next invoice is by M. N. Farr & Sons, same type of invoice, to Mohler Bros., dated February 20, 1938, invoice No. 66.

And the next——

A. Am I supposed to be checking as we go along? Go ahead.

Q. The next invoice is No. 84, dated April 30, 1938, indicating sales to J. G. Ridland .

The next invoice is No. 108, dated May 21, 1938, indicating a sale to Electrical Equipment Co.

Mr. Leonard S. Lyon: Wait a minute, Mr. Harris. You are leaving something out. I am not sure but I think some of these sales were a different type of filter medium. I think we wrote you a letter about that.

Mr. Harris: These were all the '480 patent construction. That is what we asked for.

Mr. Leonard S. Lyon: Does the witness know that?



(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. Do you know that, Mr. Farr?

A. I was just trying to check against a list here that I made up from that same letter and I kind of got lost there. [358]

Mr. Baldwin: Here is a copy of the letter.

(The document referred to was passed to counsel.)

The Witness: Yes, I think that is correct.

By Mr. Harris:

Q. That is all of those invoices down through No. 108 that I have identified, that is, they are invoices for sales of the evaporative cooler that you have identified? A. That is correct.

Q. The next document is a purchase order from Electrical Equipment Company, No. 7082, dated May 18, 1938, and that also relates to the last invoice that I have shown you, does it not?

A. That is correct.

Q. The next invoice is No. 131, dated June 14, 1938, indicating a sale to Safeway Stores. Inc. That also refers to the evaporative cooler?

A. That is correct.

Q. The next is a letter from Safeway Stores dated June 1, 1938, to M. N. Farr & Sons, and that relates to the purchase of an evaporative cooler?

A. That is correct.

Q. The next is an invoice No. 145 to Safeway Stores and that indicates a sale of evaporative coolers, does it not? A. That is correct. [359]

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. The next is a purchase order dated June 29, 1938, from Safeway Stores to M. N. Farr & Sons. That is a purchase order for the last invoice, is it?

A. Yes.

Q. The next is an invoice, No. 146, dated July 25, 1938, also to Safeway Stores, indicating an evaporative cooler sale.

A. Yes.

Q. The next is a purchase order, No. 9520, from Safeway Stores to M. N. Farr & Sons Company, covering the last invoice that I showed you.

A. Correct.

Q. And next is an invoice, 147, indicating a sale of similar equipment to Safeway Stores.

A. Correct.

Q. And last is a purchase order dated June 29, 1938, for the last invoiced equipment?

A. Correct.

Q. Those sales were all ordinary commercial sales, were they?

A. Yes.

Mr. Harris: This group of invoices and purchase orders is offered into evidence as defendants' exhibit next in order.

The Clerk: K.

Mr. Harris: As Exhibit K. [360]

(The documents referred to were marked Defendants' Exhibit K for identification.)

The Court: They all relate to the cooler?

Mr. Harris: Yes.

The Court: And not the patent in suit?

(Testimony of Richard Spencer Farr.)

Mr. Harris: Yes, Your Honor. We shall contend that that is a prior public use of the certain invention of the patent in suit.

Mr. Leonard S. Lyon: If Your Honor please, so that you will have our position in mind when struggling with this: The application for the patent in suit is a continuation of Exhibit 1-B, which was filed July 22, 1939. At that time, the law permitted you to wait two years after the first sale before filing the patent application. So, these sales which were made in November, 1937, it is our opinion, were within the two-year period.

The Court: That is so far as the patent in suit is concerned?

Mr. Leonard S. Lyon: That is correct.

The Court: That is, are you conceding by that statement that the structure used in the cooler is identical with the structure of the patent in suit?

Mr. Leonard S. Lyon: I am not conceding. No; there is the difference in the change in direction, but, even so, we contend that the parent application for the patent in suit [361] was filed within the two-year period of any of these sales, so they do not need to be considered on any question of priority or public sale.

The Court: I think I understand your situation. However, in regard to '480 I understood that the witness said that the air passed over the screen parallel to the surface. It says here, however, "These air passages, however, are not parallel with the direction of flow of the air."

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: That is right. [362]

\* \* \* \* \*

The Court: Exhibit K is admitted.

(The documents referred to, marked Defendants' Exhibit K, were received in evidence.)

Mr. Harris: Next, if Your Honor please, I have here a second group of invoices which I do not propose to go through completely. These were supplied to me by counsel for the plaintiff here as indicating invoices and purchase orders for the filter panels for the '479 patent in suit, and I understand that this invoice, dated 3-23-40, March 23, 1940, invoice No. 378, from Temperatair, Incorporated, to Western Thermal Equipment Co., was the first commercial sale of filter panels made in accordance with the '479 patent in suit. Is that correct, Mr. Farr?

The Witness: That is correct.

By Mr. Harris:

Q. And the second document is a purchase order from Western Thermal Equipment Co. to Temperatair, Inc., dated March 15, 1940, and is the order for that first commercial sale made by you under the '479 patent in suit.      A. That is correct.

Mr. Harris: I offer this invoice and purchase order just identified as Defendants' Exhibit L.

The Clerk: Admitted Your Honor?

The Court: Admitted, K and L. [363]

(The documents referred to, marked Defendants' Exhibit L, were received in evidence.)

(Testimony of Richard Spencer Farr.)

Mr. Harris: That is all, Your Honor.

The Court: Is there any redirect?

Redirect Examination

By Mr. Leonard S. Lyon:

Q. Mr. Farr, will you look at Exhibit 25, the patent on the evaporative cooler?

A. May I have a copy of Exhibit 25?

The Court: Yes, Exhibit 25.

Mr. Leonard S. Lyon: Will you hand that copy to the Court.

The Court: I have a copy here of the patent.

By Mr. Leonard S. Lyon:

Q. Referring to Fig. 1 of the drawings, what is the device 14, numbered 14 in that drawing?

A. 14 appears to me as the water reservoir.

Q. In the evaporating coolers as you sold them in 1930, beginning with the first sales, was there such a water reservoir?      A. Yes, sir.

Q. And in the operation of the device, was that reservoir filled with water?      A. Yes.

Q. What effect did that have on anything that was [364] collected by the filter in operation? I mean, if dust was collected by the filter. Strike that all out.

The effect of the wheel passing through that filter, that reservoir, was to wet the wheel?

A. It was to wet the wheel, and any dust that might be collected by the wheel would have the tendency to wash off in the reservoir.

(Testimony of Richard Spencer Farr.)

Q. So, was there any progressive loading of dust in this evaporative cooler such as has been described here as being true of your air filter?

Mr. Harris: Objected to as calling for a conclusion of the witness and no foundation laid, if the Court please.

Mr. Leonard S. Lyon: If the Court please, he may give his opinion.

The Court: He may express his opinion. It is a matter of opinion. Objection overruled.

The Witness: I beg your pardon?

The Court: I just overruled the objection.

The Witness: I interrupted your conversation. I apologize.

I would prefer to leave such questions to some of the expert witnesses.

Mr. Leonard S. Lyon: All right. With that admonition of counsel, we will do so.

The Court: Is that all with this witness? [365]

Mr. Leonard S. Lyon: That is all.

Without my reading the entire deposition of the defendant Gratiot taken in this case, I would like counsel to state whether they will stipulate that the defendant Gratiot was engaged in business, in California, in this district, of the sale of the Air-Maze P-5 filter panels like Exhibit No. 12, immediately prior to and at the time of the filing of the complaint in this action.

Mr. Harris: Yes, we so stipulate.

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I would like to read a few pages of the deposition of the defendant Gratiot into the record into evidence.

This is the deposition of Jules D. Gratiot, taken on February 1, 1950, called as a witness in this action, and he testified as follows—the deposition is on file—commencing at line 12, page 14:

“Q. In addition to the correspondence with the Air-Maze Corporation regarding the defense of this suit, have you had any conversations with officers or employees of the corporation regarding this suit? “A. Yes.

“Q. Could you tell us with whom you so conversed? [366]

“A. Yes, Mr. O. H. Schaaf, President of Air-Maze Corporation, also with Mr. W. B. Watterson, Sales Manager of the Air-Maze Corporation.

“Q. How many times have you discussed the matter with Mr. Schaaf?

“A. I would say approximately twice.

“Q. Could you describe the nature of such discussions?

“A. I would say it was in connection with the defense of the matter.

“Q. Did you discuss with Mr. Schaaf the financial aspects of the defense of the case?

“A. Yes.

“Mr. Schuck: You mean who was going to pay the attorneys' fees and costs and things?

“Mr. Lyon Q: That is correct.

“A. That's right.

(Testimony of Richard Spencer Farr.)

“Q. Did you reach any agreement on this matter? “A. Yes.

“Q. Could you tell us what your agreement with Mr. Schaaf is?

“A. The Air-Maze Corporation is going to pay for the costs of the defense, of my defense.

“Q. In other words, the Air-Maze Corporation has agreed to pay the full expenses of the present [367] litigation? “A. Yes.

“Q. Did you discuss with Mr. Schaaf the question of indemnification in the event a judgment is rendered against you personally in this action?

“A. Well, I wouldn't say we discussed it. There was an understanding established regarding that by the corporation.

“Q. What was that understanding?

“A. That they would indemnify any damages resulting therefrom.

“Q. They will pay for you any judgment rendered against you personally? “A. Yes.”

And then I would like to read, commencing at page 19, line 3:

“Mr. Lyon Q: In your conversations with Mr. Schaaf”——

The Court: You left off at line 16, page 15?

Mr. Leonard S. Lyon: Yes.

The Court: Well, isn't the rest of it material?

“Did you discuss with Mr. Schaaf the question of indemnification in the event a judgment”——

Mr. Lyon: I read down to line 2 on page 16.

The Court: Oh, page 16? [368]



(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: Page 16.

The Court: All right.

Mr. Leonard S. Lyon: Now, I am going to commence reading at line 3, page 19:

“Mr. Lyon Q: In your conversations with Mr. Schaaf and Mr. Watterson of the Air-Maze Corporation relating to the defense of this action was the question of legal representation raised?

“A. Yes.

“Mr. Schuck:”——

Mr. Schuck, I might say, as appears from the deposition, appeared as attorney for the defendants in the taking of the deposition.

“Mr. Schuck: I will stipulate in that connection that it was decided by the Air-Maze Corporation that my firm, Overton, Lyman, Plumb, Prince & Vermille, and now Overton, Plumb, Prince & Vermille, would be the general attorneys in Los Angeles for the defense of both Air-Maze Corporation and Jules D. Gratiot, and that subsequently the firm of Harris, Kiech, Foster & Harris would be associated as special patent counsel in Los Angeles for both defendants, that is in Los Angeles only, and also that those two firms are now attorneys of record for both defendants in this matter. [369]

“Mr. Lyon Q. Did you agree with the representatives of the Air-Maze Corporation that the full control of the defense in this action would be in the hands of the Air-Maze Corporation?

“A. It was never discussed.

“Q. Did you personally retain either of these firms to represent you in this action?

(Testimony of Richard Spencer Farr.)

“A. No.

“Q. They were retained solely by the Air-Maze Corporation? “A. Yes.

“Q. Have you any understanding with either of these firms relating to their responsibility to you alone——

“A. No.

“Q. ——in this action? “A. No.

“Mr. Schuck: Off the record.

“(A discussion was had off the record.)

“Mr. Lyon Q: In so far as you are concerned, the entire defense of this suit, and by that I mean the hiring of attorneys, the control of the progress of the litigation, is the sole responsibility of the Air-Maze Corporation?

“Mr. Schuck: Do you understand the question? We [370] will have it read, if you don't.

“The Witness: Yes, I understand the question. Would you read the question again for me? I say I understand it.

“(The question was read by the reporter.)

“The Witness: Yes.

“Mr. Lyon Q: In other words, have you been told simply that the entire matter would be handled for you by the Air-Maze Corporation?

“A. Yes.”

\* \* \* \* \*

The Court: The plaintiff rests?

Mr. Leonard S. Lyon: Yes, sir. [371]

\* \* \* \* \*

WILLIAM B. WATTERSON

called as a witness by and on behalf of the defendants, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: William B. Watterson.

The Clerk: Spell your last name.

The Witness: W-a-t-t-e-r-s-o-n.

The Clerk: And your address, please?

The Witness: 3071 Huntington Road, Shaker Heights, Ohio.

Direct Examination

By Mr. Baldwin:

Q. Will you state your age and your present position and occupation?

A. I am 43 years old, I am vice president of the Air-Maze Corporation in charge of sales.

Q. How long have you occupied your present position? [372]

A. Approximately five years.

Q. What has been your occupation for approximately the last 15 years?

A. For the last 10 years I have been in the Air-Maze sales department.

Prior to that I handled the advertising and sales promotion of several companies in Cleveland, among which was the Air-Maze Corporation.

A. About when did you first start to work with Air-Maze Corporation on advertising and sales of their products?      A. 1936.

(Testimony of William B. Watterson.)

Q. Will you state briefly the history of Air-Maze Corporation and name some of the chief products which it makes and distributes? [373]

\* \* \* \* \*

The Witness: The company was started in 1925 by two men who manufactured air filters under the Greene patent.

By Mr. Baldwin:

Q. Is that the Greene patent, Defendants' Exhibit B, tab 3?

The Court: Is Exhibit B in evidence?

The Clerk: No, Your Honor.

Mr. Harris: I haven't offered any of the defendants' exhibits as yet, Your Honor.

Mr. Baldwin: No. 1,566,088.

The Witness: That is the Greene patent.

By Mr. Baldwin:

Q. Continue, please.

A. The application of the filter was for automobile air intakes——

Mr. Leonard S. Lyon: May my objection stand as applying to all testimony of this witness for which no foundation has been laid as within his knowledge. I think it is obvious he is testifying to matters occurring apparently 10 years before he was connected or had anything to do with the company.

The Court: Overruled, subject to a motion to strike.

The Witness: As the company grew, new products were added until at the present time——

(Testimony of William B. Watterson.)

The Court: What was it doing in 1936 when you went with them?

The Witness: In 1936 they were manufacturing a cylindrical air filter for engines and compressors and panel filters under the Greene patent for air conditioning applications.

By Mr. Baldwin:

Q. What are they making at the present time?

A. At the present time they make seven or eight different types of panel filters, oil bath air filters, pipeline filters, backfire flame arresters, electrolytic precipitators, liquid filters and in-line silencers as well as filter silencers.

Q. Did Air-Maze Corporation have any part in World War II?

A. In World War II we manufactured a very large number of aircraft intake air filters.

We also at that time developed the liquid filter which was used on the airplanes during World War II and is currently used on the jet planes today.

As a matter of fact, that part of our business is the largest segment we have today. [375]

Q. Did Air-Maze Corporation get an Army and Navy E?      A. Yes, we were awarded two.

Q. Is the type P-5 filter panel accused as an infringement here and now marketed by Air-Maze Corporation the only filter panel Air-Maze Corporation ever put out and called Type P-5?

\* \* \* \* \*

The Witness: No.

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. What preceded it?

A. We had a panel called the old type P-5 or P-5 obsolete before that. [376]

By Mr. Baldwin:

Q. I show you Defendants' Exhibit A and ask you if that represents the P-5 obsolete type.

A. That is the P-5 obsolete construction.

Mr. Baldwin: Mark this, please.

(The device referred to was marked Defendants' Exhibit M for identification.)

By Mr. Baldwin:

Q. I hand you a small sample of wire screen, marked Defendants' Exhibit M for identification, and ask you if you can identify it.

A. This is the media construction of the P-5 obsolete.

Mr. Baldwin: I offer this in evidence, Your Honor.

The Court: Admitted.

(The device referred to, marked Defendants' Exhibit M, was received in evidence.)

By Mr. Baldwin:

Q. What can you say about the P-5 obsolete as a commercial filter?

A. It was well accepted by the trade and sold in quite satisfactory volume.

Q. What knowledge do you have in the regular course of business as to the characteristics of filter panels sold by your company, and by that I mean resistance, efficiency, and dust-holding capacity?

(Testimony of William B. Watterson.)

A. The sales department regularly receives from the engineering and test development departments of our company performance characteristics, which are curves in graphs, on all our products, as well as those of our competitors.

Q. What can you say about the pressure drop across the P-5 obsolete filter when clean and when dirty?

A. It had a low initial pressure drop and rose very slowly with dirt load.

Q. What can you say about the dirt-holding capacity of the P-5 obsolete filter?

A. It was quite satisfactory, in my opinion.

Q. What can you say about the efficiency of the P-5 obsolete filter?

A. It was quite satisfactory.

Q. During what period of time were the bulk of sales of the P-5 obsolete filter made?

A. From 1943 to 1948.

Q. Approximately how many, if you know, of the Type P-5 obsolete filters were sold by Air-Maze Corporation during that period?

A. I can't tell exactly, because our company records weren't kept in that way. but I estimate that at least 10,000 were sold in the highest year during the period of the production of that filter.

Q. You have stated that the sales of the P-5 obsolete filter ceased about 1948. What did you do then to satisfy the demand for this type of filter panel?

A. We brought out the new P-5 filter.

(Testimony of William B. Watterson.)

Q. I show you Plaintiff's Exhibit No. 12 and ask you if that is the new Type P-5.

A. Yes. That is the new Type P-5.

Q. What was the difference in construction between the old and the new Type P-5 filter?

A. The new Type P-5 filter had a bend in the crimps. Otherwise, it was the same as the P-5 obsolete.

Q. Why did you change from the P-5 obsolete to the new P-5 filter?

A. It was strictly due to sales consideration. With the P-5 obsolete, when the filter was held at an angle, you could see directly through the filter, and that created sales complaints from our sales force in the field.

Q. What proportion of the Air-Maze Corporation business now consists of P-5 panels, as near as you can estimate?

A. I would estimate that it is between 10 and 15 per cent, at the present time, of our panel business and approximately 2 per cent of our total business.

Mr. Baldwin: Mark this, please.

(The device referred to was marked Defendants' Exhibit N for identification.) [379]

By Mr. Baldwin:

Q. I hand you a sample filter and ask you if you can identify Defendants' Exhibit N for identification.

A. Yes, that is Type 50 Detroit air filter.

Q. Is that similar in construction to——



(Testimony of William B. Watterson.)

The Court: The paper one?

By Mr. Baldwin:

Q. (Continuing) —Defendants' Exhibit C?  
Is that similar to Defendants' Exhibit C?

A. It is similar, except that the corrugations are of equal size on that one and have no progressive density as we have here (indicating device). This, I believe, is called Type 25.

Mr. Baldwin: I wonder if I could cut a hole in this one like we did in the other?

The Court: Surely. It is your exhibit. You can do as you please with it.

The Clerk: Do you want to use this knife?

Mr. Baldwin: It is a better knife, I believe.

(Mr. Baldwin cuts hole in device.) [380]

By Mr. Baldwin:

Q. Would you state the direction of the corrugated passages as they go through that filter panel?

A. (Examining exhibit) I would say that they are in the general direction of the air flow.

Q. Is there a bend part way through the panel?

A. There is.

Mr. Baldwin: I offer the sample filter in evidence as Defendants' Exhibit N.

The Court: Well, it has two layers of this treated paper.

Mr. Baldwin: Those two layers are identical. Instead of being smaller corrugations than the other, it is identical.

The Court: Well, these two layers are identical and they are just set so that they reverse direction.

(Testimony of William B. Watterson.)

Mr. Baldwin: Yes.

The Court: In evidence.

(The device referred to was received in evidence and marked Defendants' Exhibit N.)

By Mr. Baldwin:

Q. State who, if you know, makes this Detroit air filter, Defendants' Exhibit N.

A. It has been made since 1932 by the Detroit Air Filter Company and its predecessors in interest, the American [381] Radiator Company. At the present time it is being made and manufactured by the Air-Maze Corporation.

Q. Is it a good filter?

A. In my opinion, it is quite satisfactory.

Q. Could you compare it with the present P-5 as to its characteristics?

A. It has seven to ten points less in efficiency but its pressure drop rise is quite similar in that it is a low pressure drop rise during dirt loading.

Q. There are two numbers stamped in black on Defendants' Exhibit C. I will read them and ask if you can tell what they refer to.

The first number is 2,019,186.

A. That is the Kaiser patent, I believe.

Q. The other number is 2,408,659.

A. That is the Lamb patent.

Q. Can you name any fields for the competitive sale of filter panels where you rarely meet competition from the Farr type filter? [382]

\* \* \* \* \*

(Testimony of William B. Watterson.)

The Witness: Yes. In the aircraft air filter panel field where every velocity over 1500 feet per minute are required, we have a panel that is approved up to around 2000 feet per minute.

Also in the field where filters are required of less than two inch thickness, also in the standard or so-called low velocity fields.

By Mr. Baldwin:

Q. Are those fields which use any considerable number of filters per year?

A. Yes, tens of thousands.

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit O for identification.

(The document referred to was marked Defendants' Exhibit O for identification.)

Mr. Baldwin: I am sorry, I do not have multiple copies of this. It is merely the type B panel of Air-Maze.

(Exhibiting document to counsel.)

By Mr. Baldwin:

Q. I hand you a pamphlet marked for identification Defendants' Exhibit O and ask you to identify it, if you can.

A. This folder describes the Air-Maze type B filter panel.

The Court: Type B?

Mr. Baldwin: Yes, like Exhibit 5. [383]

Q. I hand you Plaintiff's Exhibit 5, and ask you if that is also a type B panel such as is advertised in the pamphlet Defendants' Exhibit O.

(Testimony of William B. Watterson.)

A. (Examining exhibit) It is a type B filter panel. It is substantially the same.

Q. What differences are there?

A. Well, we made minor differences in the construction, such as the frame construction and so on, but the media construction is substantially the same.

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit P for identification.

(The document referred to was marked Defendants' Exhibit P for identification.)

(Exhibiting document to counsel.)

By Mr. Baldwin:

Q. I hand you a pamphlet marked for identification Defendants' Exhibit P and ask if you can identify it.

A. This is a folder describing the construction of our Kleenflo air filter panel.

Mr. Baldwin: Mr. Reporter, that is spelled K-l-e-e-n-f-l-o, one word.

The Court: Let me see Exhibit O.

(The exhibit referred to was passed to the court.)

Mr. Baldwin: Your Honor, I offer Defendants' Exhibits O and P in evidence. [384]

The Court: Admitted.

(The documents referred to were received in evidence and marked Defendants' Exhibits O and P respectively.)

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. Is the Kleenflo type similar to the type B as the arrangement of the filter media?

A. Yes, it is.

Q. Would you say that both the type B filter described in Defendant's Exhibit P and O are of the type where the air flow is in general perpendicular to the screens? A. Yes.

Q. Does Air-Maze Corporation now sell the type B and Kleenflo type of filter panels?

A. Yes, they do.

The Court: What did you say the Kleenflo was used for, in the high velocity installation? Is that what you said?

The Witness: No, I did not.

The Court: What did you say about it?

The Witness: I said that in general it was similar in construction to the type B filter panel.

The Court: Yes, and the Kleenflo — well, go ahead. Maybe it will develop. I thought he said something I did not catch.

By Mr. Baldwin:

Q. Will you explain the application, the general fields [385] of application, of type B and Kleenflo panels?

A. Both filter panels are used in ventilation systems to filter the dust out of the air.

The Court: Are they used competitively with the plaintiff's products of the patent in suit?

The Witness: I would say that they would be competitive. We sell them against the filter in suit.

(Testimony of William B. Watterson.)

The Court: The same type of installation?

The Witness: The same type of installation.

By Mr. Baldwin:

Q. Would you state the volume of business which Air-Maze Corporation has done in the last year for which you have figures on the type B and Kleenflo panel filters?

A. At the end of our fiscal year of October 31, 1951, we sold approximately a half million dollars of the two filters alone.

Q. Does that figure include filter panels or frames and houses?

A. No, that is just the filter panels or filter cells themselves.

Q. If you added frames and housings, would that add to the figure?

A. That would add substantially to the total dollar volume. [386]

\* \* \* \* \*

Q. Mr. Watterson, do your duties in the Air-Maze Corporation take you into the research and development department of that corporation?

A. Yes. I am there almost every day.

Q. Are you familiar with the test equipment, the test procedure, and the plotting of curves of the data contained in those tests?

A. I am familiar with that procedure.

\* \* \* \* \*

Q. State whether or not you are in position to know the test dusts used by Air-Maze and your principal competitors.

(Testimony of William B. Watterson.)

The Witness: May I have that question repeated?

(The question referred to was read by the reporter as follows:

(“Q. State whether or not you are in position to [389] know the test dusts used by Air-Maze and your principal competitors.”)

A. Yes, I am.

By Mr. Baldwin:

Q. How do you get such information of the industry?

A. Not only as sales manager of Air-Maze, but also as a member of the Technical Advisory Committee of the American Society of Heating and Ventilating, on air cleaning. We are furnished by the manufacturer members of that committee with their various methods of testing air filters and the test dusts that they use.

Q. Will you tell, if you can, what test dusts are being used by Air-Maze and other filter panel manufacturers?

Mr. Leonard S. Lyon: I object to that, as far as “other filter panel manufacturers” are concerned.

The Court: Sustained. Air-Maze is one.

Mr. Baldwin: He has stated, your Honor, that he, as a member of this Technical Advisory Committee, has been furnished with such information.

The Court: Objection sustained.

By Mr. Baldwin:

Q. What does Air-Maze use?

(Testimony of William B. Watterson.)

A. Air-Maze uses two types of test dust. One is what we call the 80-20, which consists of 80 per cent Pocahontas fly ash, to go through a 200-mesh screen, and 20 K-1 lampblack. [390]

The other test is the National Bureau of Standards test dust, which consists of 96 per cent Cottrell precipitate and 4 per cent cotton linters.

Q. Would you explain what the 80 per cent fly ash does, what does that determine or indicate?

A. Pocahontas fly ash.

The Court: Are there different kinds of fly ashes?

The Witness: Well, there could be.

By Mr. Baldwin:

Q. Is this a light or heavy type of ash?

A. It is a relatively light type of ash.

Q. Why do you test with both kinds of dust, one with lint and one without lint?

A. We do that to show the effect of filters when they are placed in locations where a lint is present in the air, because the characteristics of the filter, or, rather, the test results of the filter change.

Q. What effect does the lint have?

A. The lint very substantially increases the resistance of the filter during the test run.

The Court: It makes it dirtier, in other words?

The Witness: It increases the pressure drop very rapidly, because it clogs up, clogs the filter itself.

By Mr. Baldwin:

Q. What knowledge do you have as to the cleaning of [391] filter panels in the field, such as the Air-Maze Type B, Kleenflo, and P-5?



(Testimony of William B. Watterson.)

A. I have reason to be close to that, because several of our distributors either have now or have had cleaning set-ups and I have seen them in operation.

Q. What can you say as to the difficulty of cleaning a Type B Air-Maze panel?

A. They have had no particular difficulty in cleaning the Type B filter.

Q. Have you any evidence in the field that the Type B panel can be cleaned successfully?

A. One of our large customers in the railroad field has used the Type B filter for many years, and they have continued to buy them in large quantities year after year.

The Court: Did they clean them?

The Witness: And they cleaned them. They have reported to us no particular difficulty.

The Court: How often do they clean them, do you know?

The Witness: One railroad that I am thinking of cleans them approximately every three weeks.

The Court: That is, filters on passenger cars?

The Witness: On passenger cars and sleepers.

The Court: Those on the dining car, I suppose, are cleaned more often than the others?

The Witness: Yes. It depends on the dirt load.  
By Mr. Baldwin:

Q. I call your attention to page 36 of the file wrapper, Plaintiff's Exhibit 1-A, and ask you if you have studied and understand what is shown on that page.

(Testimony of William B. Watterson.)

The Court: Page 36?

Mr. Baldwin: 36 of the file wrapper, your Honor.

A. I have studied the graph, yes.

The Court: Is that the graph? Hold it up.

All right.

By Mr. Baldwin:

Q. Have you studied the curves marked "2" on this page 36 of Exhibit 1-A, representing the performance of the Air-Maze Type B panel?

A. Yes, sir, I have.

Q. What comment, if any, have you to make about those curves marked number "2"?

A. I have seen any number of graphs, performance test graphs, on a Type B filter, and I have never seen any that showed as low initial resistance as this does, nor have I seen anywhere the arrestance, as in the curve at the top, that took a downward slope. They invariably will slope upward as the dirt loads up the filter and the efficiency increases.

Q. In your work, in the sale of Air-Maze filter panels, what do you run across as to the pressure drop limits specified for the use of filter panels in commercial and industrial [393] air-conditioning systems?

A. Almost invariably it is a maximum of a half inch of water when the filter is dirty.

Q. Also in the sale of the engine filters, that is, the air intake to engines of the type which is often referred to in the trade as oil-bath filters, what are the limits of the pressure drop or restrictions

(Testimony of William B. Watterson.)

through that type of filter as you meet it in the field?

A. They will vary generally between 6 inches and 16 inches of water. We now have oil-bath filters on engines at the present time that are operating at over 6 inches of water.

The Court: That is, pressure loss?

The Witness: Loss, yes.

The Court: And by that you mean to say an explanation that was given by the first witness?

The Witness: Yes, sir..

By Mr. Baldwin:

Q. Do you in your work, in the sale of Air-Maze filter panels for air-conditioning systems, have any knowledge as to the usual design of commercial and industrial air-conditioning systems, as to the pressure drop which they allow through the filter panels of the system?      A. Yes, sir, I have.

Q. What are the usual conditions as you find them?

A. Generally they permit up to half an inch of water [394] resistance when the filter is dirty.

Mr. Baldwin: Will you mark this, please.

(The document referred to was marked Defendants' Exhibit R for identification.)

By Mr. Baldwin:

Q. I hand you a record marked for identification Defendants' Exhibit R and ask you if that is a record received by you in the regular course of business in your position at Air-Maze Corporation?

A. It is.

(Testimony of William B. Watterson.)

Q. And I ask you whether the record shown on Defendants' Exhibit 9 for identification is a record received by you in your position at Air-Maze, in the regular course of business.      A. It is.

Mr. Baldwin: Your Honor, I offer Exhibits Q and R in evidence under the statute.

Mr. Leonard S. Lyon: I object, your Honor, on the ground there is no foundation laid.

The Court: I don't think there is, counsel. These are records of the company, but there isn't any foundation to show where they got the information or how. It may be that someone just sat down and drew some lines on a piece of paper. I apprehend that, with respect to Exhibit R, the plaintiff Farr will accuse you of that, anyhow, after looking at these lines. [395]

(Conference between counsel.)

By Mr. Baldwin:

Q. Mr. Watterson, these records for identification, Defendant's Exhibits Q and R, state if you know whether or not these were made in the regular operation of the departments of Air-Maze Corporation not for the purposes of this lawsuit but in the regular course of keeping records at the Air-Maze Corporation.      A. That is correct.

Mr. Leonard F. Lyon: I object to that as leading and suggestive, no foundation laid.

The Court: Well, it is leading and suggestive, but that objection is overruled.

There are still records but there is no foundation to show where the data came from or how. They

(Testimony of William B. Watterson.)

might keep records like this in the course of their business, but there is nothing to show that they are true.

By Mr. Baldwin:

Q. Do you know of your own personal knowledge, Mr. Watterson, how and where and by whom these records as shown in Defendants' Exhibits Q and R for identification were made?

A. May I have that question again?

(The question referred to was read by the reporter, as follows: [396])

("Q. Do you know of your own personal knowledge, Mr. Watterson, how and where and by whom these records as shown in Defendants' Exhibits Q and R for identification were made?")

The Witness: Yes, I think that they were made at my request, and they were made in our laboratory by our technicians. The curves were plotted by our assistant chief engineer at my request.

By Mr. Baldwin:

Q. And were you in such personal contact with this that you have knowledge of the truth and veracity of these records?

Mr. Leonard S. Lyon: I object to that as calling for a conclusion of the witness.

The Court: Sustained.

Mr. Leonard S. Lyon: And not a statement of fact.

The Court: Sustained.

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. You have stated your work at Air-Maze Corporation took you constantly, I believe you said daily into the department where these records are made, is that right?

A. Almost daily when I am in town.

Q. And you are familiar with the plotting of these graphs of these records?

A. In general, yes. [397]

Q. And these were made by the people who usually make such records for you when you request them?

Mr. Leonard S. Lyon: I object to that; no foundation laid.

Mr. Baldwin: He has stated that he requested them. I am referring to Defendants' Exhibits Q and R for identification.

Mr. Leonard S. Lyon: He didn't say he has seen these records made. I don't know how he knows who made them. He can state what directions he gave, that is all.

The Court: Sustained. Don't you have your engineer here?

Mr. Baldwin: No, not in California, your Honor.

I again offer Defendants' Exhibits Q and R for identification as evidence, your Honor.

Mr. Leonard S. Lyon: Same objection; no foundation laid.

The Court: Objection sustained.

Mr. Baldwin: You may cross examine.

Mr. Leonard S. Lyon: No cross examination.

\* \* \* \* \* [398]

KENNETH F. RUSSELL

called as a witness by and on behalf of the plaintiff herein, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Kenneth F. Russell; R-u-s-s-e-l-l.

The Clerk: And your address?

The Witness: 665 West Tenth Street, Claremont, California.

Direct Examination

By Mr. Harris:

Q. What is your occupation, Mr. Russell?

A. I am general manager and chief engineer of the Vortex Company.

Q. Where is the Vortex Company located?

A. Claremont, California.

Q. How long have you been employed by Vortex Company?

A. I have been employed by Vortex about 22 years.

The Court: V-o-r-t-o-x?

The Witness: V-o-r-t-o-x.

By Mr. Harris:

Q. In general, what type of products does Vortex Company currently make?

A. Vortex Company manufactures air filtering [399] devices of various types, including oil bath air cleaners, panel air filters, separators, breather caps.

Q. How long, to your personal knowledge, has Vortex been in that general line of business?

(Testimony of Kenneth F. Russell.)

A. The Vortex Company has been manufacturing oil bath air cleaners since about 1919 or 1920.

Q. That was before you were with the company?

A. That was before my time.

Q. Since 1929, what type of products have they made?

A. Since 1929 we have been manufacturing oil bath air cleaners and breather caps and since about 1946 we were manufacturing panel air filters.

Q. State briefly the general nature of your duties with the company.

A. Well, as general manager and chief engineer I supervise the production facilities and devote the major portion of my time to the development and also the production, design and tool design for the organization.

Mr. Harris: Will you mark these, please?

The Clerk: Exhibit S.

(The exhibits referred to were marked Defendants' Exhibit S for identification.)

Mr. Harris: I produce a panel type filter sample which I ask to be marked as Defendants' Exhibit S. [400]

The Court: That is a 10-inch square?

Mr. Harris: Yes, your Honor; approximately.

And another one which I ask be marked as Defendants' Exhibit T.

(The device referred to was marked Defendants' Exhibit T for identification.)



(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. I show you Defendants' Exhibits S and T, Mr. Russell, and ask you if you are familiar with those products.

A. (Examining exhibits) Exhibit S is a sample or a bottle of the Vortox panel filter called the V-N which is used in normal service.

Q. And what is the one Exhibit T for identification?

A. And the one identified as T is the Vortox panel air filter type V-R, which is used for railroad service primarily.

Q. Are those made in that size or are they made in larger or smaller sizes?

A. No, they are made in all sizes up to approximately 30 x 30.

Q. Do you make any in the 20 x 20 size?

A. Yes, 20 x 20 is the most popular size.

Q. Two inches thick? [401]

A. Two inches thick.

We also manufacture them one inch, two inches, and four inches in thickness. [402]

Q. Why is the corner cut off Exhibit S for identification?

A. Well, the corner has been removed to expose the filter element to prospective purchasers and to see the construction of the unit.

Q. In either of these panel filters, Exhibits S or T, is there any wire screen member which extends generally parallel to the direction of flow of air through the filter? A. No.

(Testimony of Kenneth F. Russell.)

Q. Is there any wire mesh at all in Exhibit T?

A. In T there is no wire mesh of any kind.

The Court: That is expanded metal front and back?

The Witness: Yes.

The Court: Does it have the same depth as this other one except a different gauge wire?

The Witness: The wire is the same diameter, the coils are the same diameter, but there are more of them in it.

The Court: They are more closely compacted in it?

The Witness: Yes.

The Court: And it has expanded metal facing front and back?

The Witness: Yes.

The Court: What do you call this, just coiled wire?

The Witness: Just coiled wire spring. We refer to them as springs quite frequently. [403]

The Court: And packed at random?

The Witness: They are packed at random. They are packed on a machine. And these little springs are fabricated about—well, they run 1200 to 1500 a minute and they run down a chute and go in through a packing mechanism into the filter containers.

The Court: And the difference between the two is that on the S type you have expanded metal facings?

The Witness: That is the face, that is the front face.

(Testimony of Kenneth F. Russell.)

The Court: That is the introduction?

The Witness: Yes.

The Court: And the downstream side, you have one expanded metal on the back and immediately in front of that you have about—what is that, 14 gauge?

The Witness: That is either a 14, somewhere between 14 and 18 mesh.

The Court: Wire screening?

The Witness: Yes.

The Court: And T does not have that?

The Witness: No, it is a reversible unit.

The Court: It has the same wire inside only compressed tight?

The Witness: Slightly more.

The Court: How much by pounds? Do you measure it?

The Witness: We do it by volume. But it amounts to, [404] in a 20 x 20 filter there is approximately three and a half pounds of filter element in the S, and in this T there would be in a 20 x 20, which is a little thicker, about a quarter of an inch thicker, and this will have about four and a half pounds, between four and four and a half pounds.

The Court: An additional pound in the 400 square inches?

The Witness: Yes, sir.

By Mr. Harris:

Q. How long have filter panels of that character shown by Exhibits S and T been made and sold by the Vortex Company?

(Testimony of Kenneth F. Russell.)

A. Well, the panel S in that particular form and that weight and density has been manufactured since about 1946.

The T, the one shown in Exhibit T, has been manufactured since about three years.

Q. With the 20 inch panels in those types, what air capacity are those sold for?

A. We sell them up to 1200 cubic feet for a 20 x 20.

Q. Can you state generally what the efficiency of those panels is?

A. Well, our efficiency size are determined in our own laboratory and there is considerable variation between them.

Let me say this, that the efficiency is competitive and comparable with the units on the market.

The Court: How about the pressure drops?

The Witness: The pressure drops are very similar also. [405]

The Court: Similar to what?

The Witness: To the competitive units on the market such as the Farr or the Air-Maze.

The Court: You mean the Air-Maze P-5 or the other Air-Maze?

The Witness: The Air-Maze P-5.

Mr. Harris: I produce a Vortox catalog which I ask be marked as Defendants' Exhibit U for identification.

(The document referred to was marked Defendants' Exhibit U for identification.)

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Mr. Russell, is Defendants' Exhibit U a catalog published by the Vortex Company to illustrate its products?

A. This is one of the catalogs that we published; yes.

Q. I call your attention to one of the bulletins found in this catalog which relate to the Vortex type V-R filter, and there is a series of curves on that sheet entitled "Performance Data."

Do you personally have any responsibility for the making of such curves?

A. As chief engineer of course I supervise them. The curves in this particular——

The Court: Do you supervise the tests in which those curves are recorded?

The Witness: The laboratory at Vortex is directly under [406] my supervision.

The tests are supervised by me and the actual collecting of the data is done by the men in the engineering department under my direction.

As to the plotting of the actual curves, no, I didn't plot these curves.

By Mr. Harris:

Q. Are those curves substantially correct to the best of your knowledge as illustrating the performance of that filter?

A. Yes. It is rather a small scale and they are within the limits of the test dust and the apparatus that we use.

Q. What do you mean within the limits?

(Testimony of Kenneth F. Russell.)

A. Oh, in testing filters with relatively fine dust you have a problem of flocculation in the dust.

The Court: What?

The Witness: Flocculation. In other words, the dust has a tendency to gather together in small groups, so that gives you a little variation of perhaps plus or minus two or three per cent.

By Mr. Harris:

Q. Would those curves be illustrative of the operation of the filter panels, Defendants' Exhibits S and T?

A. Yes, those curves would be more of the T; the S would have not quite the same dust holding capacity. The [407] efficiency would be slightly less and the pressure drop slightly less.

Mr. Harris: Exhibits S and T for identification are offered in evidence as Defendants' exhibits of the same number.

Mr. Leonard S. Lyon: Objected to as immaterial and irrelevant. They are not asserted to have been manufactured prior to the patent in suit. They are not part of the prior art.

Mr. Harris: No, certainly not, but there is a claim here that filter panels of the plaintiffs is a very wonderful and marvelous thing. We have some competitive panels that illustrate anybody can make them.

Mr. Leonard S. Lyon: The fact that somebody else might get up some other filters seven years later has nothing to do with it. The defendant doesn't claim it is manufacturing anything like S or T.

(Testimony of Kenneth F. Russell.)

The Court: This will go to the commercial success claimed?

Mr. Harris: Yes.

The Court: How could that effect the commercial success?

Mr. Harris: It disproves the plaintiff's claim here that the plaintiffs by this invention had a very wonderful and novel thing which took the industry by storm and everyone wants to use that and the defendants want to use that.

I think the showing that there are comparable filters—— [408]

The Court: It would not go to that because he said they have not been selling it or how many they have sold or whatever information I may want to use.

Mr. Harris: It isn't to the commercial success, but it goes to the question as to whether or not to make a filter of high velocity and low pressure drop, high efficiency, you have to use this patent in suit, and that is what Mr. Lyon contends you have to do.

We wish to disprove that statement. I think it is certainly material under the allegations made in the opening statement.

Mr. Leonard S. Lyon: I don't think I made quite that statement. I made the statement that this invention taught the art something new, and accomplished results and established standards in this industry that were brand new and unique at the time the invention was made.

(Testimony of Kenneth F. Russell.)

Now seven or eight years later somebody else might have come in and found another way of doing the same thing——

The Court: These were made in 1946, S, and T since about 1948, and the evidence concerning the patent in suit is that they have been making them since 1940. Of course their commercial success began in '41 during the war and continued through subsequently.

Even if the object to be attained is high efficiency and low pressure drop, and S and T both answer the market demands [409] in that respect, how could that affect what the plaintiff claims here was a new and novel method of obtaining high velocity and low pressure drops by the Z element and flowing the air along the flat of the screen rather than through it? [410]

Mr. Harris: It affects the issues in this case solely if the plaintiff contends here, as I think they do, as they lay a foundation to contend later that their filter panel provides some wonderful, marvelous thing that you can't get any other way, and this goes directly to that issue.

The Court: I do not understand that the plaintiff has made that claim. I understand from the evidence and the statements made by Mr. Lyon that the plaintiff claims that it does obtain a high rate of efficiency and low pressure drop by what it claims is a new and novel method. I do not understand them to assert that no other filter obtains that. In fact, one of the witnesses on the stand, Professor



(Testimony of Kenneth F. Russell.)

Duncan, said that there is another method, an electrical method, which is very high, greater in efficiency than these, but it is too expensive to put in.

Mr. Harris: So long as the plaintiff is not going to make that contention, I agree that this is immaterial. If the plaintiff does make it, then, I think that this evidence that we are offering now is material on that question.

Now, if they want to give up that contention, that the Farr patent in suit provides the only, or substantially the only way to make a high-velocity, high-efficiency, low-pressure-drop filter panel, then of course I agree that this is not material. Otherwise, it is material.

The Court: Well, I don't understand from the evidence or [411] remarks of counsel that they claim that that is the only one.

Mr. Harris: I understood they had.

The Court: But they claim a novel way to secure it.

Mr. Harris: I think we will have that statement, your Honor, before the case is done.

The Court: Of course they can argue that in connection with commercial success. In that event, this goes to commercial success, but it is not competent to prove that, because it does not show how many of these have been sold, nor have there been and figures introduced as to the total sales in the United States, for instance, of air filters.

Mr. Harris: None are available, I understand.

The Court: It may well be, on commercial suc-

(Testimony of Kenneth F. Russell.)

cess, that the plaintiff has been highly successful in the matter, but it may be that every other air-conditioner manufacturer has been successful in selling any other kind of a product. I mean comparatively so, from year to year. Anyhow it is time for a recess.

(Short recess.)

Mr. Harris: May we now have a ruling on Exhibits S and T, your Honor?

The Court: Go ahead.

Mr. Lyon: My objection is already of record, your Honor.

The Court: I have been thinking about the testimony of the plaintiff's witnesses in connection with the claimed [412] advantages, cheapness in cost of construction, ease of cleaning and re-oiling, as among the elements going to the commercial success. These may be admissible and may go to that point, although presently there is not any testimony on these two items concerning that, and for that reason I will have to sustain the objection.

By Mr. Harris:

Q. Mr. Russell, how do the panels, Exhibits S and T for identification, compare in cost to the user with Farr and Air-Maze panels?

A. Well, the S unit, which we call our VN, is competitive in price to the Kleenflo of the Air-Maze, and the VR is slightly less, as I recall, than the Farr.

Q. Than the Farr filter here in suit?

(Testimony of Kenneth F. Russell.)

A. So far as price is concerned, they are competitive with the Farr, the VR is competitive with the Farr, and the VN is competitive with the Kleenflo.

Mr. Leonard S. Lyon: I don't know what he means, if the Court please, by "competitive." Are they sold for the same price or are they sold cheaper? They might be competitive because they are sold cheaper.

By Mr. Harris:

Q. What do you mean by that, Mr. Russell?

A. By "competitive" I mean it compares within acceptable limits to the customer. The list price would be probably [413] within less than a dollar, but due to the price structure, the way they change and the variations in discount, it is difficult to say how they compare exactly. I don't know.

Mr. Leonard S. Lyon: If your Honor please, a Chevrolet is competitive with a Cadillac in that sense. It is not clear to me what the witness means by "competitive."

The Court: Well, I suppose that all these air filters, all that are on the market, are competitive with one another. A customer might not want to pay an additional price or he may feel it is better to buy the paper one and throw it away, or he may have some special use for which one type or the other would be more suitable to his purpose. All automobiles, as you say, are competitive to one another, although they are not in the same price range.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Well, Mr. Russell, will you state what the list sales price of each of these two types of filters is in a 20 by 20?

A. The type S, or the filter that is designated as S, which is a Vortex VN2, 20 by 20, has a selling price of \$6.25.

The Court: You have your catalog there?

The Witness: I have my own price list.

The Court: Is that the catalog in evidence?

Mr. Harris: No, your Honor, we haven't gotten to this catalog yet. [414]

The Court: I thought you had the catalog marked for identification.

Mr. Harris: It is, your Honor. I will hand it to the clerk.

The Court: Go ahead.

The Witness: The Vortex VR2, which is the same type as illustrated by Exhibit T, has a list price of \$12.40, and if you put handles on it, it would cost you \$13.

By Mr. Harris:

Q. Have you had any experience with the question of cleaning these filter panels illustrated by Exhibits S and T?

A. Yes. We have manufactured a cleaning machine which is in operation in Los Angeles and has been in operation for a number of years. This machine is entirely automatic. A man places a filter on the carrier. It is carried through a washing unit, then it goes through an oiling unit. It is allowed to

(Testimony of Kenneth F. Russell.)

drain and, after that, it is ready to be serviced. In watching that operate, we, of course—this company services all makes of filters, Farr, Air-Maze, American, and Vortex, and it is my opinion that the Vortex services as easily as any of the others. That is, the lint is easily washed out.

Mr. Harris: I renew my offer, your Honor.

Mr. Leonard S. Lyon: The same objection.

The Court: Admitted for that limited purpose. Objection [415] overruled.

The Clerk: S and T?

The Court: Did you say you didn't object or you still object?

Mr. Leonard S. Lyon: The same objection.

The Clerk: That is S and T you are referring to?

Mr. Harris: Yes.

The Court: Yes.

(The devices referred to, marked Defendants' Exhibits S and T were received in evidence.)

\* \* \* \* \* [416]

By Mr. Harris:

Q. Mr. Russell, what technical educational background have you?

A. I graduated from the California Institute of Technology, with the degree of Bachelor of Science in engineering, mechanical engineering.

Q. And when did you graduate?

A. 1929.

Q. Do you belong to any technical societies?

(Testimony of Kenneth F. Russell.)

A. Yes. I belong to the American Society of Mechanical Engineers and, of course, I have the professional license of "Professional Engineer" in the State of California.

Q. Do you personally have any interest whatever in the outcome of this litigation?

A. No. None.

Q. Do you know of any agreement or understanding of any kind between your employer, the Vortex Company, and either of the defendants in this case, relative to the litigation or relative to the outcome of the litigation?

A. No, sir. There is none that I know of.

Q. What experience have you had, if any, with letters patent?

A. Well, in the course of developing the products that we manufacture, applications have been made for patents and a [418] number of patents have been issued in my name, and in following the applications and that procedure, I have become familiar with the rules of the Patent Office to that extent.

Q. Have you read and studied the number '479 patent in suit?

A. Yes, sir, I have.

Q. Do you have that before you?

A. Yes.

Q. Will you state briefly what construction is shown and described in that patent?

A. Well, this is a panel filter that is described in this patent for removing dust from air. It is of a through-passage type. It consists of alternate layers of strips of fly screen or screen material that has been crimped, and the other layer is left flat.

(Testimony of Kenneth F. Russell.)

These layers of material are stacked to form passageways through the filter in the direction of the air flow.

Q. Is there any type of construction described in this specification other than that illustrated in the drawings of the patent in suit?

A. No. I have not found any.

\* \* \* \* \* [419]

Q. I note that Claim 4 of the patent in suit uses the following words:

“said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular——”

The Court: Just a moment. That is Claim 4?

Mr. Harris: Claim 4.

The Court: Line what?

Mr. Harris: Starting with line 46.

The Court: Let me catch up with it.

Mr. Harris: “said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow.”

Q. Mr. Russell, do you find anything in the specification of the patent in suit which defined what is meant by [421] that phraseology of the claim?

A. No, I do not.

Q. Again in Claim 7 in the patent in suit—and I refer you to starting at line 36—it says:

“said passages subdividing a panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered.”

(Testimony of Kenneth F. Russell.)

Do you find any description of discussion in the specification of this patent in suit which defines what is meant by that terminology in that claim?

A. No, I do not.

\* \* \* \* \* [422]

The Court: Do you find anything in the drawings which explains the language in those two claims or illustrates it?

The Witness: I find the drawings that it is illustrated if you assume that the dimensions that are referred to in the claims are the horizontal or the width and the height of the filter. Assuming that that is what they mean by "dimensions," yes, I would say it was illustrated in the patent drawings.

The Court: What about the whole phrase "said members being constructed and arranged so as to effect a multiple subdivision of the panel in both directions perpendicular to the general direction of flow of medium to be filtered, thereby forming passages extending through said filter"? That is Claim 4.

The Witness: In the drawings the construction is such that it would indicate that it would be described by that.

The Court: In other words, with that language in front of you and the specifications and the drawings it takes meaning?

The Witness: It takes a meaning; yes.

By Mr. Harris:

Q. Do you find anything in the specifications or drawings which indicates what the direction of flow of air is relative to this filter panel of the '479 patent?

A. Yes, I do. [423]



(Testimony of Kenneth F. Russell.)

On page 1, column 1, lines 28 to 39 inclusive, it states, in effect, that the air flows along the walls of the passages.

The Court: On lines parallel to the plane or planes of the screen cloth?

The Witness: That is right. It says that on the contrary I have found by arranging the screens in the filter panel to provide paths for the airflow along lines parallel that, roughly speaking, a high filtering efficiency can be effected by this means.

On page 2, column 2, on line 40, the patent describes and indicates that it is necessary for the air to flow through the screens or the screen walls of the passage in order to provide satisfactory efficiency.

By Mr. Harris:

Q. Is that to you consistent or inconsistent with the first statement that you read from page 1, column 1? A. They are inconsistent.

Q. Now that doesn't quite answer the question I had in mind. I will rephrase it.

As to the direction of flow of the air relative to the face of the panel, and before it gets to the panel in the '479 patent, is there anything in the specification or drawings that would indicate what the direction of flow of the air is relative to the face of the panel? [424]

A. I don't recall of any specific statement to that effect.

\* \* \* \* \*

(Testimony of Kenneth F. Russell.)

Q. Is the air flowing perpendicular to the face of the panel or is it at an acute angle to the face of the panel or is there any description or illustration in this patent in [425] suit as to what the direction of airflow is relating to the face of the panel and before it gets to the panel?

A. I do not recall of any specifically.

Q. I show you Defendants' Exhibit E and call your attention to the small diagram on the back page entitled "Progressive Loading," and ask you if in your opinion that is a correct illustration of the airflow through the Farr panel here in suit.

A. In general, yes, I would say it is.

The Court: Before we get off the subject and before I forget it, a while ago in Claim 7, referring to that clause in line 36, "said passages subdividing panel in both dimensions perpendicular to the general flow of the medium to be filtered," does that clause and phrase take meaning in view of the drawings?

The Witness: Yes, if you consider that the passages are defined by the mesh screening members. If that is what they mean by the passages.

By Mr. Harris:

Q. What type of passages are those, Mr. Russell?

A. In Claim 7?

Q. As shown in the patent in suit.

A. The passages in Claim 7—pardon me—the passages that are shown in the patent in suit and the drawings are completely enclosed from entrance to exit. They are a continuous [426] passage, that

(Testimony of Kenneth F. Russell.)

is, the walls are continuous of gauze or screen material.

Q. Do you have a copy of the book of prior art before you, Mr. Russell, Defendants' Exhibit B?

A. Yes, I do.

Q. Have you carefully studied all of the patents that are included in that exhibit? A. Yes.

Q. Will you refer first to the St. Cyr patent, tab No. 1, and will you describe briefly what is shown and described in that patent?

A. The patent describes a gaseous fuel mixture. This device is cylindrical and is defined to be inserted between the carburetor, that is, the metering jets of a carburetor, and the intake of an engine.

It is shown in Fig. 1 as No. 4.

The Court: Just a moment. Let me find it. Fig. 4?

The Witness: Fig. 1, No. 4, shows the device inserted in the pipe between the carburetor and the engine.

By Mr. Harris:

Q. What is shown in Figs. 3 and 10?

A. Figs. 3 and 10 are two forms of this device and shows how they are fabricated.

Fig. 10 shows the unit which consists of layers of corrugated strips of gauze material with a flat sheet of the [427] same material wrapped into a spiral to form a cylindrical unit shown in Fig. 10.

The corrugated material is shown in Fig. 5 or Fig. 8.

Q. How do those corrugations in those two forms extend with relation to the flow of air?

(Testimony of Kenneth F. Russell.)

A. The corrugations shown in Fig. 5 are at an angle with the edge of the strips and when rolled into a spiral form as shown in Fig. 10 or 3, the corrugations form a helix, take the form of a helix.

Q. Perhaps to better illustrate that we can produce another exhibit, which I ask be marked as Defendants' Exhibit V.

(The document referred to was marked Defendants' Exhibit V for identification.)

(Exhibiting device to counsel.)

By Mr. Harris:

Q. Will you identify Exhibit V for identification to the court?

A. Exhibit V is the general construction of the device of this patent as disclosed in Fig. 10.

Q. And in what direction do the corrugations run when the wire mesh material is wound in a spiral as illustrated in this Exhibit V?

A. They take the helical form.

Q. What is the purpose of the flat layer in that [428] exhibit?

A. The flat layer prevents the alternate layers or the successive layers from nesting. That is the primary purpose of it.

It also adds material.

Mr. Harris: I produce another model which I ask be marked as Defendants' Exhibit W.

(The device referred to was marked Defendants' Exhibit W for identification.)

(Testimony of Kenneth F. Russell.)

The Court: Is this the St. Cyr patent also?

Mr. Harris: That is the St. Cyr too, your Honor.

Q. Will you explain to the court what that Exhibit W illustrates?

A. W illustrates the device as shown in Fig. 3 of the St. Cyr patent.

The Court: Neither 3 nor 10 have any core in this patent, do they?

The Witness: No, your Honor.

The Court: Whereas Exhibit V and Exhibit W both have a core?

The Witness: Substantially they are similar. The core is there to space it.

By Mr. Harris:

Q. So far as the layers of wire mesh are concerned, are they the same as illustrated in the St. Cyr patent? [429]

A. The relationship of the successive layers is the same; yes.

Mr. Leonard S. Lyon: All the way through? Is this a response to your Honor's question about this core, how this core got in here, when it isn't in the patent?

The Court: I do not know what it is in response to. I suppose it is in response to his question. He said that the core is put in here to space it.

The patent drawings in neither Fig. 3 nor Fig. 10 show a core, do they?

The Witness: No, they don't your Honor.

By Mr. Harris:

\* \* \* \* \* [430]

(Testimony of Kenneth F. Russell.)

Q. In these models, Mr. Russell, are they wrapped from the inside out?

The Court: How could they wrap from the inside out?

The Witness: I assume they would be. I don't know how you would do it from the outside in.

The Court: I would not either, but anyway you are an engineer.

The Witness: I don't think I could do it.  
By Mr. Harris:

Q. Referring to the construction shown and described in the St. Cyr patent, do those wire mesh members operate as filters?

A. The device, although it is described as a gaseous fuel mixture, on page 1, column 1, line 8 to line 12, it states that the invention is for the purpose of vaporizing liquids.

Then on the same page, column 1, line 30, it states that [431] the fuel is at issues from the jet of the carburetor and is sprayed upon this material, so therefore this material stops the droplets of fuel that are being carried along with the airstream and in stopping them they obviously are filtering them out of the air.

Q. If there was dust in such flow would it filter the dust out?

Mr. Leonard S. Lyon: I object to that. There is no foundation laid.

The Court: Overruled.

The Witness: In my opinion, they would act as a filter if made as shown in the drawing, either Fig. 3 or Fig. 10.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Now as to the corrugations——

Mr. Leonard S. Lyon: Your Honor please, I would like to ask to be heard further on my objection. What is this dust in the gasoline, is it dissolved in the gasoline or what?

Mr. Harris: Let's find out from the witness.

Q. What goes into the filter unit illustrated—I won't characterize it as a filter unit—what goes into the device illustrated in Fig. 2 of the St. Cyr patent?

A. Air from the outside atmosphere goes in, also fuel from the carburetor jets.

Q. And what form is that fuel in?

A. The fuel is in the form of droplets. Of course [432] some will vaporize but there is a large percentage that would not be vaporized.

Q. Now referring to the corrugations illustrated in Figs. 3 and 10 of the St. Cyr patent and also Figs. 4 and 6, when those devices are completely formed, that is, wound in the spiral form as shown there, do the corrugations extend straight through the unit from the inlet to the outlet end?

A. No, not when they are wound.

Q. Can you allustrate that by referring to Exhibits V and W? Point out to the court what you mean by your answer.

A. What I mean is that the direction of this corrugation at this point (illustrating) is in this direction and it obviously changes until it comes out at this point (indicating). So therefore the

(Testimony of Kenneth F. Russell.)

corrugations are not straight through in that sense of the word.

The Court: Well, they are illustrated to be straight through in Fig. 7 in the St. Cyr patent, are they not?

The Witness: In Fig. 7 it shows them with the corrugations formed as in Fig. 8.

The Court: Straight?

The Witness: Straight.

By Mr. Harris:

Q. But how about Fig. 5?

A. Fig. 5 shows them on a diagonal or at an angle with the edge of the strip. [433]

Q. And if they were formed on a diagonal of that character, what would be their form in the finished device?

A. When they were formed they would take the shape or the form that is shown in this model V.

\* \* \* \* \* [434]

By Mr. Harris:

Q. Where does the air come from that goes through the device?

A. The air comes from the atmosphere, goes through the carburetor, through the device, through the manifold and into the engine. In going through the carburetor, the gasoline or fuel, let us say fuel, is sprayed into the air stream. The mixture of droplets of fuel and air then pass through the device, which is a vaporizer, specified as a vaporizer.

The Court: Well, is it intended that air should be sucked in through this, on this machine, that is, before it gets to the carburetor?



(Testimony of Kenneth F. Russell.)

The Witness: No, sir.

The Court: And by this appears to be completely enclosed by Fig. 1?

By Mr. Harris:

Q. Can you clarify that, Mr. Russell?

A. Yes. Let me see if I can find a reference. It states that the device is between the carburetor and engine.

The Court: That is after the fuel has been mixed with the air, is that correct, in the carburetor?

The Witness: Yes, sir.

The Court: Therefore, it has air in it?

The Witness: It has air.

The Court: Go ahead and answer the question. How is it [437] removed?

The Witness: Air would flow through this unit, some along the path formed by the corrugations, and then passes between the corrugations, and some of the air would flow through the screens. The general direction would be primarily coaxial with the unit. As dust that would be carried in the air would impinge upon the screen surfaces, these corrugations near the entrance, as these surfaces became clogged with dust, the air would then be diverted along the passages formed by the corrugations until cleaner——

Mr. Leonard S. Lyon: If your Honor please, I think, so we can understand the witness' testimony, he should point on Fig. 1 to where the air gets into this device at all from the atmosphere. He is talking as if air was going through these screens.

(Testimony of Kenneth F. Russell.)

The Court: It says between the carburetor and the engine.

Mr. Leonard S. Lyon: Yes.

The Court: Now, can't the court take judicial notice of the fact that a carburetor mixes air with gasoline?

Mr. Leonard S. Lyon: That is right [438]

\* \* \* \* \*

The Court: I don't know whether the gasoline would clean the dust as it flows or not. Would it?

The Witness: It would have a tendency, if there was sufficient gasoline that was flowing under this screen, and it must be carried away in the form of liquid, and it would carry the drops of dust with it.

The Court: I mean the droplets of vapor, being sucked into the vaporizer.

The Witness: The droplets of gasoline impinge upon the screen. Then they are spread out and evaporated. They are vaporized as described in the specification. So, therefore, the vapor probably would not carry the dust with it and there would be a certain amount of dust that would be left on the screen.

By Mr. Harris:

Q. Would it or would it not be separated out by the impingement principle? [439]

A. It would be separated. [440]

\* \* \* \* \*

Q. What type of screen member or gauze, or what is this that these elements 4 are made of in this patent?

A. It states, on page 1, column 2, line 100:

(Testimony of Kenneth F. Russell.)

“The body of the device is formed of a strip of wire gauze 4.”

Q. What does that mean to you?

A. Well, gauze is a woven material as I know it, and being wire gauze I would say it was woven out of wire.

Q. Do you have any idea as to what mesh that wire was that was called wire gauze?

A. There isn't any indication as to the mesh, as I recall. [441]

\* \* \* \* \*

Q. In industry in general, Mr. Russell, is a product called “wire gauze” employed?

Mr. Leonard S. Lyon: In general?

A. In general, yes.

The Court: Does it have a commonly understood meaning in the industry, “wire gauze”?

The Witness: Yes. It is a woven material, and it is [442] of the finer size. I would not call a half-mesh wire gauze.

By Mr. Harris:

Q. Well, what mesh size would you include in that?

Mr. Leonard S. Lyon: I object to that as incompetent.

The Court: What he would in the industry generally understand, if he knows, the term of “wire gauze.”

Mr. Harris: Yes, certainly.

A. As we refer to it and as I know it, wire gauze is of the finer wire cloth or the woven material of wire.

(Testimony of Kenneth F. Russell.)

The Court: I still don't know what it is. It is just finer. Finer than what?

The Witness: It would be in the range—it isn't specifically defined. The name "wire gauze" is a term that is a very general term. The specific term is "wire cloth," for instance, industrial wire cloth. People in Detroit manufacture a complete line, going from 200 mesh up to a half mesh, and the wire gauze, as I interpret it, because I know of no definite specifications as to what it is, I interpret it to be somewhere below 14 mesh.

By Mr. Harris:

Q. In this St. Cyr patent, does it include a plurality of wire gauze members extending in the general direction of the intended flow of the medium to be passed through it?

A. In Fig. 10 it shows parallel—it shows numerous passages and they are defined by wire material or wire gauze. [443]

Mr. Leonard S. Lyon: I object to the answer as not responsive to the question. I think the answer to the question is, there is one sheet shown in Fig. 10, one continuous sheet.

The Witness: In Fig. 10 there are two sheets that are shown, so there are multiple sheets.

The Court: Overruled. Objection overruled.

By Mr. Harris:

Q. Now, then, are such wire gauze members constructed and arranged so as to effect a multiple subdivision, a cross-section of the unit in two dimensions perpendicular to the general direction of flow of fluid through the unit?

(Testimony of Kenneth F. Russell.)

A. Depending upon the definition of "two dimensions," but on the general assumption that "two dimensions" means in two directions, yes.

Q. Does that subdivision form passages extending through the St. Cyr element from the inlet to the outlet end?      A. Yes, they do.

Q. Do such passages change in direction?

A. Yes, they do, since they are helical in form.

Q. What is the extent of that change in direction in that St. Cyr device, in those passages?

A. Referring to the drawings of the patent, it indicates that this change of direction is appreciable. The change in direction appears to be somewhere in the neighborhood of [444] 180 degrees.

\* \* \* \* \*

Q. Mr. Russell, will you turn next to tab 2 in Defendants' Exhibit B, which is the Henshaw patent, No. 1,548,839, and describe what is disclosed by that patent?

A. The title of the patent is ventilator. However, the specifications are devoted primarily to the disclosure of a filter. Refer to page 1, column 1, lines 11 to 16.

Q. What sort of a filter is that?

A. The filter disclosed in this patent is of a panel air filter type. It is of the through type and consists of parallel plates as shown in Fig. 2. These parallel plates are formed in the shape of a W and spaced apart to give an air passage, a free air passage, through the unit from the upstream to the downstream side as indicated in the arrow in Fig. 2.

(Testimony of Kenneth F. Russell.)

The plates may be of perforated metal as shown in Fig. [449] 3. The general direction of the airflow, as I have indicated, is from face to face.

The air flows through——

The Court: As indicated by the arrow passing through Fig. 2?

The Witness: Yes, sir.

The Court: And as indicated by the arrows in Fig. 1?

The Witness: Yes, your Honor.

By Mr. Harris:

Q. Does all of the air there go down the passages?

A. No. The patent indicates that the air flows through the plates as well as in the channels.

Q. By "channels" what do you mean?

A. The channels are the spaces indicated as 17, 18 and 19.

The Court: That is, you refer to those as passages, Mr. Harris, do you?

Mr. Harris: The witness referred to them as "channels" and I merely wanted to know what he was referring to.

The Court: You referred to them as passages. You asked him about passages. You said, does the air flow through the passages.

Mr. Harris: Yes.

The Court: And he said it flows through the plates as well as the channels. Are you talking about the same thing? [450]

By Mr. Harris:

(Testimony of Kenneth F. Russell.)

Q. Are we talking about the same thing, Mr. Russell?

A. Yes, I am referring to the passages between the plates.

Q. As the channels? A. As the channels.

The Court: This plate has four faces.

The Witness: It has four sections; yes, sir.

The Court: And the first face or section has holes that are larger than the second, and the third plates, and the second and third plates have holes which are larger than the fourth plate, 1, 2, 3 and 4 being the direction of the flow?

The Witness: That is right, sir.

A number of holes per square inch as indicated in Fig. 3 increases from the upstream side to the downstream and the holes become smaller in each section.

The Court: Now what are those things called 10 in this drawing in Fig. 1? Are they plates also or merely solid baffles?

The Witness: Those are indicated as baffles.

The Court: And what is 11 in Fig. 1?

The Witness: 11, as I recall, describes a wire mesh screen. On page 1, column 1, line 50, "and wire mesh screen 11 positioned in the wall box 12 which constitutes the fresh air inlay of the casing." [451]

The Court: That is just a section there?

The Witness: Yes, sir.

The Court: In other words, there are open places with wire mesh and some with wire mesh, is that it?

(Testimony of Kenneth F. Russell.)

The Witness: Well, I assume that the cross-section in Fig. 1 shows a very enlarged screen. In other words, a large mesh merely to keep out large objects, such as sheets of paper, is my assumption.

The units 10 are described as louvres on page 1, column 1, line 49.

The Court: Very well. [452]

By Mr. Harris:

Q. If the plate 16, the herringbone plate 16, shown in Fig. 2 were made of wire fly screen, would the device operate the same or differently?

A. The operation would be similar. However, I believe the wire mesh could be obtained in sizes that would be more efficient. You are rather limited in the number, in the types and sizes of openings in perforated plates that can be obtained.

Q. Would there be any advantage in using wire fly screen instead of the perforated plates?

Mr. Leonard S. Lyon: I object to that testimony on the ground there is no foundation laid and there is no testimony here that the witness has made any tests with any device built according to this patent. It is pure speculation and pure opinion.

The Court: It is purely opinion. He is testifying as an expert. It goes to the weight of his testimony rather than to its admissibility.

Mr. Leonard S. Lyon: I want to make objection.

The Court: Objection overruled.

Mr. Leonard S. Lyon: It is not based on any experimental evidence.



(Testimony of Kenneth F. Russell.)

The Court: Well, you may ask him on voir dire, if you wish. [453]

Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a device built like this device shown in this Henshall patent?

A. As specifically shown in this drawing, no, sir.

Q. You have never tested such a device?

A. No, sir.

The Court: Have you ever tested it with a wire screen?

The Witness: Yes.

The Court: This device?

The Witness: Not this device with the wire screen, no, sir.

The Court: All right.

Direct Examination—(Continued)

The Court: You may answer the question:

In your opinion would it be as efficient with wire screen as with perforated baffle plates?

Mr. Harris: That was not the question, your Honor. I asked if there would be any advantage in using wire screen instead of perforated baffle plates.

Mr. Leonard S. Lyon: I don't see anything wrong with the court's question.

The Court: Well, all right. I thought that is what you were driving at. Leave your question stand and then I will ask him my question. [454]

Mr. Harris: You ask him your question first, your Honor.

(Testimony of Kenneth F. Russell.)

The Court: Go ahead. Answer his question.

The Witness: The question, as I understand it, is: Would there be any advantage in using screen material, cloth material, in place of the perforated metal?

By Mr. Harris:

Q. Yes:

A. I believe there would be, so far as the economics are concerned. At the present time, woven material, wire cloth, is less expensive than is perforated metal.

Q. And that would be the only advantage so far as you see?

A. I don't see any other.

\*\* \* \* \*

Q. Turning next to the Greene patent, tab No. 3, Patent No. 1,566,088, I don't think we need describe that because there has been evidence in regard to that patent.

The Court: I would like to know something about that patent.

Mr. Harris: Very well.

Q. Would you briefly describe that Greene patent, Mr. [455] Russell?

The Court: The think I want to know is the direction of the flow of air. How is it introduced? It isn't indicated here on any of these drawings, although on page 1, column 2, line 90, it states: ". . . in which the dust-carrying gas or air is allowed to pass through a plate or screen approxi-

(Testimony of Kenneth F. Russell.)

mately at right angles to the normal plane of such plate or screen," the "normal plane," I take it, being when it is flat is that correct?

The Witness: That is my understanding, that the air passes through the screens.

By Mr. Harris:

Q. Can you illustrate it?

The Court: In other words, on Fig. 3—let us take one of the others.

The Witness: Fig. 5, sir?

The Court: Let us say Fig. 5. The air would pass at right angles to this diagram, is that right?

The Witness: That is right. It would flow either left to right or right to left.

The Court: It would flow either left or right or right to left, as the diagram shows. It differs, then, from the patent in suit, the flow of air flows from top to bottom or bottom to top in the patent in suit?

The Witness: That is right, your Honor. May I correct [456] that? In Fig. 5 it would flow from front to back, which would be the better indication of the patent in suit, or back to front.

The Court: Well, suppose the top is the back.

The Witness: That would be the same thing.

The Court: All right. And then, of course, the bottom would be the front?

The Witness: Yes, sir.

The Court: On Fig. 8, which way would the air flow?

The Witness: In Fig. 8, the air would flow either

(Testimony of Kenneth F. Russell.)

inward or outward. The action in the center could be either the outlet or the inlet.

The Court: That is, the air would still flow from left to right or right to left, or top to the bottom; it would not flow through?

The Witness: The air would be in the plane of the sheet of paper. The air flow would be in the plane of the sheet of the drawing.

By Mr. Harris:

Q. Will you refer to the Greene patent and can you illustrate to the court, pointing with your pencil, how that flows?

The Court: Well, I will draw an arrow on here. It would flow either this way or that way (indicating)?

The Witness: That is right. [457]

The Court: Yes, this way or that way (indicating), is that correct?

The Witness: That is correct.

The Court: It would flow down?

The Witness: Perpendicular.

By Mr. Harris:

Q. Can we describe that as a radial flow in that figure?

A. Yes, that would be a radial flow.

The Court: Or it might be said the air would flow from outside to the inner circle, or from the inner circle to the outer one?

The Witness: That is right.

The Court: All right.

\* \* \* \* \*

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Mr. Russell, will you turn to tab No. 4, Patent No. 1,576,121 to Preble, in the prior-art book, and briefly explain that disclosure therein to the court?

A. The disclosure here is a filter unit for filtering [458] particles of dust from gas, described on page 1, column 1, lines 13 to 16.

The unit is shown in cross-section in Fig. 11.

The main filter media is the central portion shown in Fig. 11 and consists of parallel plates of a foraminous material.

The Court: Is that what is called the filtering media, on page 1, line 39, in the patent, where it says, "In one type, the filtering media comprises split wire or mineral wool which, after being assembled in the filter cell, is passed through a special process in which each fibre of the filtering media"—

The Witness: I believe the patent is describing prior art there, your Honor.

The Court: Yes.

The Witness: Just previous to that, it says, "Two types of all-metal filter units have been developed which are non-combustible." The description of the construction——

"The Court: This is "a filtering media of simplified and improved construction," says the inventor, column 2, page 1, lines 55 to 58.

The Witness: In that paragraph, yes, sir.

By Mr. Harris:

Q. Referring to Fig. 11, Mr. Russell, in talking

(Testimony of Kenneth F. Russell.)

about the filtering media, which of the objects shown in that view, [459] the drawing, are the filtering media? I don't think you have given the numbers of them.

A. The main filtering media is described on page 2, column 2, lines 94 to 96, where it states, "The main filtering media within the filter cell comprises a stack 28 (Fig. 11)"—and stack 28 is composed of the parallel sheets 29, 30, and so on, alternately stacked.

The Court: What is the flow of air? Is it from top to bottom?

The Witness: In Fig. 11 they indicate an inlet side and an outlet side, and the air flows from left to right in the patent drawing.

By Mr. Harris:

Q. Now, what does the patent teach that those horizontal sheets may be made of?

A. The patent states on page 1, column 2, lines 87 to 89, that the material is made of foraminous sheets, and it may be of metal or wire mesh screens, or it may also be manufactured of expanded metal.

Q. Are those wire mesh screens flat, or what is their configuration, according to this patent?

A. The patent is not too clear as to the construction of the mesh screens. However, it does indicate that when you fabricate an expanded metal, there may be alternate layers of reinforced rib type construction as shown in Fig. 5 and Fig. 6 and the expanded metal as shown in Fig. 7 with the end view shown in Fig. 8. [460]

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: Your Honor please, I don't know—maybe you can follow this—but I am having difficulty. What particular parts of this structure the witness says are made out of expanded material and what part he says are made out of something else, I can't tell.

The Court: Fig. 1 indicates 31. 31 is found in Fig. 11 and is the first sheet vertically placed in the inlet and outlet side.

Fig. 2—I cannot figure that one out.

Fig. 3 is designated as 32, which is found as two sheets going vertically, only one of them on the outlet side and two of them on the inlet side.

Fig. 3, by Fig. 9, appears to be a woven wire screen with two layers on the outlet side in Fig. 11.

30 by Fig 7 is indicated to be—what do you call it, expanded metal?

The Witness: Expanded metal; yes, sir.

The Court: I do not know what 29 is. I do not see 29.

Mr. Leonard S. Lyon: 29 is in Fig. 5. It shows strands of something.

The Court: Yes.

By Mr. Harris:

Q. Now, Mr. Russell, are those sheets or layers 29 and 30, are they flat or are they corrugated or what is their form? [461]

A. On page 2, column 2, line 107 to 111, it indicates that the preferred construction is that the stack 28 is composed of double mesh herringbone expanded metal sheets No. 29 as illustrated in Fig. 5

(Testimony of Kenneth F. Russell.)

and 6, and that the intervening sheets are also of—pardon me—are of corrugated expanded metal and are shown in Fig. 7 and 8 and indicated as No. 30.

Q. Is this filtering unit illustrated and described in the Preble patent of the through type?

The Court: What is through type?

By Mr. Harris:

Q. Will you explain to the court in general what the type of filter is that is described here?

A. In order to differentiate between filters where all of the air must pass through screens, relatively fine orifices, in order to get through the filter and the filters that have bypass openings so that when the filter elements become clogged the air may have a free passage around the screens, that is the type that I have been referring to here as the through type.

The Court: And the Farr is not a through type?

The Witness: It is a through passage type. It has a bypass for the air.

The Court: A through passage type?

The Witness: A through passage type.

The Court: The other is just a through type?

The Witness: The other is a through type.

Mr. Leonard S. Lyon: Wait a minute. It seems to me everything is a through type by this testimony.

By Mr. Harris:

Q. Referring back to the Greene patent, tab 3, is that what you refer to as a through type?

A. No, the Greene patent I would not refer to as a through type.



(Testimony of Kenneth F. Russell.)

Q. Why not?

A. Because the screens are transverse to the air flow and all of the air must flow through the screens.

Q. Whereas in the device of the Preble type all the air need not flow through the screens?

Mr. Leonard S. Lyon: I object to that as leading and suggestive. Look at the screen 33.

The Court: You mean you are objecting to the answer which you anticipate he will give and you are not objecting to the question.

Let us go back to the Greene patent. You say that is not the through type?

The Witness: No, sir.

The Court: The air, you said, had to flow on Fig. 5 from left to right or right to left?

The Witness: Perhaps the word "through" is misleading. However, in order to define between the two types of filters [463] you have the filter where the air may pass around the screens and pass through passages or through openings or through paths where the air may pass from the upstream to the downstream side of the filter without going through a fine mesh screen.

In the Greene type of patent it has to go through the screens.

The Court: Then a through type is not a through type?

The Witness: Yes, sir.

By Mr. Harris:

Q. Now is the Farr panel shown in the '479 patent here in suit, is that a through type?

(Testimony of Kenneth F. Russell.)

A. That is a through type. There are distinct passages to bypass the air from the upstream to the downstream side.

Q. And the Air-Maze P-5 panel, is that a through type?

A. That would be a through type also. There are pathways through there by which the air can go from the downstream to the upstream side.

The Court: Then a through type is one where the air does not have to pass through the screen?

The Witness: Yes, your Honor.

The Court: What is one that does have to pass through the screen?

The Witness: You have me there. How about a transfer screen type? [464]

The Court: I do not.

The Witness: I would suggest that that would be a transfer screen type.

By Mr. Harris:

Q. How about the Henshaw patent, tab 2, is that or is that not a through type filter?

A. That is a through type filter.

Q. Now turning next to—

Mr. Leonard S. Lyon: We haven't got what type the Preble is in view of this screen 31.

The Court: In screen 31 and these other things here, I do not know—well, all right.

The Witness: I am not exactly answering your question but the patent states, on page 1, column 2, line 101 and continues on to page 2, column 1, down to line 11, and it states there that the section is in-

(Testimony of Kenneth F. Russell.)

licated by the screens 31, 32 and 33 on the outlet side and also the inlet side 31 and 32 may be omitted.

By Mr. Harris:

Q. How do those vertical members 31 compare with the expanded metal screens on the front and back of the Air-Maze filter illustrated by Exhibit 12? A. They would be the same.

The Court: How do screens 33 in Fig. 11 of the Preble patent, of which there appear to be three layers of them on [465] the outlet side, compare with any of the material that has been introduced here? Compare with what has been introduced here as 14 mesh wire screen?

The Witness: I would assume that the screens 33 could be fabricated out of 14 mesh screen. They are shown in the drawing in Fig. 9.

The Court: Is there anything in the patent that says the size of the opening or the gauge, I guess you would call it, of the mesh?

The Witness: It does describe them as——

Mr. Leonard S. Lyon: Look at line 27 on page 3, column 1, to shorten it up.

Mr. Harris: What is that reference?

Mr. Leonard S. Lyon: Line 27, column 1, page 3.

The Court: Fine wire screens, they are called.

The Witness: Yes, sir.

The Court: Very well.

By Mr. Harris:

Q. Would those fine wire screens 33 perform any substantial filtering function?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: I object to that. There is no foundation laid. I don't know what it is going to be in this device or what isn't going to be in it. The witness has never testified, as far as this testimony goes, that he has ever tested anything in this device. [466]

The Court: You can ask him on voir dire.

### Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a filter unit constructed as illustrated in this Preble patent?

A. No, I have not.

Q. Then you have never tested one?

A. No, I have never tested one.

### Direct Examination—(Continued)

By Mr. Harris:

Q. Mr. Russell, referring you back to the Vortex panel filter, which is Exhibit S, I note a fine screen on one side of that. What is the function of that?

A. The function of that is to increase the efficiency a slight amount.

Q. Does that operate in the same way as in the Preble patent?

A. I would assume it would.

Q. Where would the bulk of the filtering take place in the Preble construction as illustrated in Fig. 11?

Mr. Leonard S. Lyon: Same objection; no foundation laid.

(Testimony of Kenneth F. Russell.)

The Court: Same ruling. It is merely his opinion and it goes to the weight of his opinion rather than to its admissibility.

Mr. Leonard S. Lyon: I call your Honor's attention to [467] the fact that in the transcript the question would be in the form as stated and not in the form "have you an opinion" or "what is your opinion."

The Court: The objection is sustained to the form of the question.

By Mr. Harris:

Q. In your opinion, then. I will qualify it to that extent.

A. In my opinion, there would be some filtration take place from the upstream to the downstream depending upon the types of material that are used, and you are given quite a leeway here. You can use either screens or expanded metal or various types of expanded materials.

However, in general I would say that if the filter were properly designed in accordance with this patent the majority of the filtering would take place in section 28.

Q. Now does the patent say anything about how the air goes through the panel, and if so point that out?

A. In general it indicates the inlet and the outlet sides in the drawing Fig. 11.

It also states on page 1, column 2, lines 78 to 82, that the air currents wind back and forth in a zig-zag or undulating manner through the material in the stack 28.

(Testimony of Kenneth F. Russell.)

The Court: What is meant on page 1, column 2, line 95, from there on—let's say about line 93—“and best to employ [468] an alternate series of corrugated and double mesh herringbone expanded metal sheets because of the large number of strands thereof which are bent in all directions, thus exposing enormous aggregate area of sticky surface to the air passing filter.” What is meant by “bent in all directions”?

The Witness: By referring to some of the previous exhibits, expanded metal——

The Court: I know what expanded metal is, but how is it bent in all directions?

The Witness: Well, as it is sheared and then expanded you have surface at various angles, and I interpreted that passage to mean that the expanded metal after it was corrugated even presented more planes upon which the dust could impinge as illustrated in Fig. 8.

Then in the herringbone discussion and a double mesh herringbone expanded metal sheet, line 95, my interpretation is that that is shown in Fig. 5 and Fig. 6.

By Mr. Harris:

Q. Can you point out to the Court anything in this patent which teaches how the dust is removed from the flow beyond what the Court has just read?

\* \* \* \* \* [469]

The Witness: Well, on page 1, column 2, lines 82 to 85, it states that the dust particles are re-

(Testimony of Kenneth F. Russell.)

moved from the air by sudden and repeated changes in direction.

By Mr. Harris:

Q. I refer you to page 2, column 2, line 115 and following. What does that passage mean to you?

\* \* \* \* \* [470]

The Witness: As I interpret it, it merely means that this filter is composed of what you might call numerous elements placed in various directions to cause the dust to impinge upon those surfaces.

By Mr. Harris:

Q. This patent refers to fine wire screen. What would be, in your opinion, the mesh of such a fine wire screen as mentioned here?

A. The patent of course is dated 1925—that is some time ago—but interpreting it in the present time the screen that is generally used in filters of this nature would be in the range of 14 to 18 mesh and, as I recall the wire diameter, it would be in the neighborhood of .011 inches in diameter.

Q. Referring next to the Slauson patent, tab 5, Patent No. 1,729,135, will you briefly describe to the Court the construction illustrated in that patent?

A. The patent describes here an air and oil filter. The description is primarily devoted to the construction of [471] the air filtering element.

Referring to Fig. 1, this air filtering element is shown in the drawing by the corrugated mass inside of the cylindrical unit.

It is fabricated from strips of corrugated and flat material that are wound spirally and the entire

(Testimony of Kenneth F. Russell.)

assembly is then inserted into the cylinder No. 1, Fig. 1.

Q. How does that compare with the disclosure of the St. Cyr patent, to which you earlier referred?

A. The construction would be similar with the exception that the material in the St. Cyr patent is a wire cloth.

Q. What is the material in this Slauson patent?

A. The material used in the Slauson patent is either wool felt or cotton cardboard as described on page 1, column 2, lines 89 to 94.

Q. Where is this air and oil filter shown in the Slauson patent designed for use?

A. The unit is designed primarily for installation on internal combustion engines, air compressors and the like. It is described on page 1, column 1, lines 13 to 14.

Q. Where would that be installed on an internal combustion engine?

A. It would be installed on the air intake to the internal combustion engine or the air compressor.

Q. Where with relation to the carburetor? [472]

A. On an internal combustion engine, if it were a gas or gasoline engine, it would be upstream from the carburetor, that is, ahead of the carburetor.

Q. What is the general direction of flow of air through this device with reference to Fig. 1 of the Slauson patent?

A. Referring to Fig. 1, the air flows in at the top through the screen 16 and out through the tubular connection indicated as 20.



(Testimony of Kenneth F. Russell.)

The Court: No. 7 in Fig. 1, what are they?

The Witness: The combination of oil filter and air filter is that oil is introduced into the channel 5 and, as I interpret the patent, the wall, the inner wall of that angular reservoir No. 4, consists of a filtering material such as felt or cotton cardboard, and the oil, by capillary action flows down the cylindrical wall of the felt material, the absorbent material.

It also of course spreads through the remainder of the unit and coats all of the walls in the filtering element.

Excess oil, due to capillary action, would of course collect at the bottom of the element, the bottom of the filter element, and so they have formed in this particular drawing in Fig. 1 a spiral channel that conducts the oil away from the lower edges of these elements and conducts it into the second reservoir at the bottom of the unit indicated as [473] 8 in Fig. 1.

By Mr. Harris:

Q. Referring to Fig. 5, Mr. Russell, what in general does that illustrate?

A. Fig. 5 shows a form of the filtering material with the corrugations or the crimps of the material at an angle to the edge of the sheet, that is, on a bias.

Q. Is there any teaching in this patent of any other type of corrugation that has been illustrated in Fig. 5?

(Testimony of Kenneth F. Russell.)

A. Yes. They also indicate on Fig 8 the corrugations may be perpendicular to the edge of the sheet. [474]

By Mr. Harris:

Q. And is there any teaching as to any other type of corrugation?

A. Yes. On page 1, column 2, lines 89 to 94, they state that the corrugations may run on a diagonal, they may be spiral, zigzag, or S-shaped, or straight across, as illustrated in Fig. 8. [475]

\* \* \* \* \*

The Court: I did not so understand your question. The objection is overruled. This is just merely the expression of an opinion, now.

You have never constructed this device nor seen it operate?

The Witness: That is right.

\* \* \* \* \*

Q. If this filter element shown in the Slauson patent were made with zigzag corrugations such as you have indicated that the patent teaches, and if it were made of wire screen, [476] fly screen, in your opinion would this filter work the same or differently than the filter element illustrated in the '479 patent in suit?

A. It would, substantially the same.

Q. And comparing that device with the round filter made by the Farr Company, illustrated by Defendants' Exhibit D, what if any difference would there be?

A. It would be the same.

(Testimony of Kenneth F. Russell.)

Q. Turning next to tab 6, which is the Orem patent, No. 1,756,758, will you describe briefly the construction and operation of the device shown therein?

A. This device is an air cleaner, and in its form shown in the patent it is particularly adapted to be attached or be connected to an engine. The device consists of cylindrical filtering elements and a by-pass for the air in the event that the filtering elements become clogged. The unit is shown in Fig. 1.

The air enters through the openings 4 and flows to the carburetor through the tube 7.

The Court: Wait a minute.

By Mr. Harris:

Q. Now, you better take it a little more, in detail, then, so the court can follow the flow of air through this device.

A. In detail, the unit consists of concentric [477] cylindrical filtering elements, as shown.

Q. What number?

A. No. 34, No. 31, No. 26 and No. 18.

Q. Just a moment. Now, how does the air flow?

A. The air flows in through the openings 4, down the passage indicated as D, which is an annular passage, and when the unit is relatively clean, that is, when it is first placed in operation after being cleaned, the air flows through the filter element 34, thence through the passage F and out through the——

The Court: Wait, wait. Here it is.

(Testimony of Kenneth F. Russell.)

A. (Continued) Before it gets to F, it goes through the annular passage 27, thence through F and out through the tube 7.

By Mr. Harris:

K. 27 isn't a passage, I don't think, Mr. Russell. Will you check that?

A. I am sorry. I will correct that. I believe the passage is indicated as 36. It is way up at the top.

Q. Isn't it J?

The Court: Well, down at the bottom it is J, and up at the top it is——

The Witness: What I am referring to is E, down at the bottom, E.

Mr. Harris: Let us look at the bottom, then.

Q. Then, air comes in through the opening 4, down the annular passage D, flows through the filtering element 34, you said?

The Court: At places indicated, at any places indicated by the arrows?

The Witness: By the arrows.

The Court: Is that right, into E, and if it doesn't get through there, it goes up around the top, is that correct?

The Witness: Yes.

The Court: And comes down H?

The Witness: It goes through J. H is an orifice to control the amount of air back pressure, and J is the annular space.

The Court: And it gets out of both through the wire screen back into E and goes out, is that correct?

(Testimony of Kenneth F. Russell.)

The Witness: That is correct.

By Mr. Harris:

Q. What happens if the outer filter element 34 becomes clogged with dirt or dust?

A. As described in the patent, when the screens 34 or the filtering element 34 becomes clogged, then the air by-passes to the next screen, 31, and then, as successive screens are clogged, it finally flows through the opening C and out through to the carburetor by a free path.

The Court: Where? [479]

The Witness: Through the cylinder 7.

The Court: How does it get to 7 from passage K?

The Witness: It flows through at the upper right hand side, the orifice, into the chamber indicated as 22, thence it flows through the cylindrical chamber out through the opening 20.

The Court: That is F.

The Witness: And thence, when all the screens are dirty, the final path will be through the annular passages and finally down through the central tubular passageway indicated as L, as indicated by L, then through the opening 20 and out through the tube 7.

The Court: All right.

The Witness: This action is described briefly on page 1, column 1, lines 10 to 27 inclusive. It is described in detail on page 2, column 1, line 49, and finishes in column 2, at line 102.

By Mr. Harris:

(Testimony of Kenneth F. Russell.)

Q. Now, is this or is this not a through type filter such as you have referred to?

A. Yes, it is.

Q. And what is the primary purpose of this device, the construction of it, as stated in that patent?

A. The primary purpose of the device is to filter air, to remove dust from the air that is entering the carburetor [480] of an engine.

Q. In what manner?

A. By filtering through the filtering elements that were described.

The Court: By passing through the holes in the screen?

The Witness: The filtering element in this patent——

The Court: Or passing along the surface of the screen, which?

The Witness: The air is filtered, first, by passing through the screens, and then, as described on page 1, column 1, lines 22 to 27, it states that the air is baffled and the dust is removed in that manner, so that the air flows first through the screens and then along the filtering material.

By Mr. Harris:

Q. And what effect would that have on dust removal?

The Court: In your opinion.

The Witness: Which part of the operation?

By Mr. Harris:

Q. The latter part, the second part.

(Testimony of Kenneth F. Russell.)

A. It would have some cleaning effect.

The Court: Well, a baffle is generally understood to be a solid material, isn't it?

The Witness: Quite often it is, yes, your Honor.

The Court: Have you ever heard of a baffle plate that isn't? [481]

The Witness: Throughout the prior art, these older patents quite often refer to baffles and then go on to state that these baffles may be made of screen material, as I recall. It is rather loosely used.

The Court: Did you ever construct this device?

The Witness: No, I did not.

By Mr. Harris:

Q. Referring next to tab 7, which is the Merryweather patent, No. 1,841,250, will you briefly describe the construction illustrated there?

A. The patent is titled "Furnace." However, on page 1, column 1, lines 1 to 7, it states that the object is to provide a filter in combination with the furnace. The filter referred to throughout the patent is shown in Fig. 3 as 21.

Q. What is Fig. 2?

A. And Fig. 2 shows the unit by itself, separate. In the Fig. 1, this same unit is shown as 21.

Q. All right. Now, how is that filter unit made up?

A. This unit is described as being parallel sheets of material placed at an angle to the air flow, as shown in Fig. 2 and Fig. 3.

Q. What is that material from which those sheets are made up?

(Testimony of Kenneth F. Russell.)

A. The patent describes the material as wire gauze or screens. [482]

The Court: Where?

The Witness: On page 2, column 1, lines 24 to 26.

Mr. Harris: That just says "wire gauze."

The Witness: "While the baffle plates 23 may be constructed of any suitable material, I prefer to construct the same of wire gauze \* \* \*" Then later he refers to it.

By Mr. Harris:

Q. Where?

A. Page 2, column 1, lines 17 to 20. [483]

\* \* \* \* \*

The Witness: Then, previous to that, he states, on page 2, column 1, line 17 through line 21, "The rectangular frame is provided with a plurality of vertically positioned rectangular baffle screens 23 \* \* \*"

Q. Now, I call your attention to page 2, column 1, lines 39 to 41. Does that cast any light on this?

A. I am sorry. Yes, it does. This also gives a brief operation of the unit. It states that "The baffle screens are arranged in a position where a large amount of air will flow through the wire screens 23. A large amount of dirt, dust or lint carried by the air and not precipitated in the drawer 18 will be lodged in the screens 23."

Q. Does this patent or does it not use the terms "wire gauze" and "wire screen" interchangeably?

A. Yes, it does. [484]

\* \* \* \* \*



(Testimony of Kenneth F. Russell.)

Q. Now, Mr. Russell, will you describe the operation of the device illustrated in the Merryweather patent as it is stated in the patent itself?

A. The air flows through the passageway in Fig. 3 and approaches the filter perpendicular to the face in the general direction——

Q. Just a moment. What is the direction of air flow in general?

The Court: In Fig. 1 it would be from right to left.

The Witness: It would be from right to left as indicated by the arrows. That is the general flow, upstream and downstream of the filter.

In Fig. 3 it would be approximately through the screens parallel to the general direction of flow.

The Court: And by "through" you mean through in the same sense that you have previously said, that it does not flow through the meshes, it flows through the meshes and along and athwart?

The Witness: I am afraid I have been confusing on that. The direction of air would be parallel to the general direction of the flow and would pass through the interstices of the screens.

The Court: It would have to pass through the interstices of the screen? [486]

The Witness: When the screens were clean a large portion would go through the screen and a small portion might go down through the passages. By Mr. Harris:

Q. Now where in the patent do you find any description of that operation?

(Testimony of Kenneth F. Russell.)

A. On page 2, column 1, lines 34 to 44 inclusive, it states that the air will flow through the interstices of the screen 23 and it describes in brief the operation of the unit there.

Q. What reference was that, Mr. Russell?

A. Page 2, column 1, lines 34 to 44.

Q. Then referring you to column 2 on page 2, line 79 and following, what does that teach you?

A. On page 2, column 2, it teaches that the arrangement of the plates are such that as the dust accumulates on the screens where it would have to fill the interstices and when they become entirely filled with dust or other matter, then the air can pass along the screens to where, by the baffling device, it will not seriously interfere with the ordinary passage of air. And that is described in lines 79 to 87.

Q. In your opinion, what would be the progression of dust accumulation on the screens in the Merryweather patent?

A. In my opinion, the dust would accumulate on the [487] entrance portions of the screen or the upstream half and as these become loaded with dirt the airflow would be directed along the screens until it found fresh openings and then would pass through the screens.

Q. And in your opinion what effect would the accumulation of dust or dirt on the screens in that device have upon the pressure drop through the device?

A. They should have very little effect.

(Testimony of Kenneth F. Russell.)

Q. Referring next to tab 8, which is the Kaiser patent, No. 2,019,186, will you briefly describe what is illustrated there?

The Court: This Kaiser patent, was there not one of the exhibits produced here on that?

Mr. Harris: Maybe we could simplify that. I will withdraw the question and ask you this, Mr. Russell:

Q. I show you Defendants' Exhibit N and ask you if that bears any relation to this Kaiser patent we have referred to.

A. (Examining exhibit): The Exhibit N is similar to the construction shown in Fig. 5 except considering the scale to which the drawing Fig. 5 was made, the space between the two sections appears to be somewhat larger in the exhibit than is indicated on Fig. 5.

Q. You mean it is larger in the sample filter Exhibit N than it is in Fig. 5 of the Kaiser patent? [488]      A: That is right.

The Court: Let me see it. Exhibit N is the one that has the same size openings on both sides?

The Witness: Yes.

The Court: There was another one here that had large openings on one side and smaller on the other as in Fig. 7.

Mr. Harris: Yes, Your Honor.

Mr. Baldwin: That is Exhibit C.

Mr. Harris: That is Defendants' Exhibit C, which I hand to the Court.

The Court: Is this not one also, No. 16? These are the same, are they not?

(Testimony of Kenneth F. Russell.)

Mr. Harris: Substantially.

Q. I will show you Plaintiff's Exhibit 16 and Defendants' Exhibit C and ask you if they are as illustrated, in your opinion, in the Kaiser patent.

A. (Examining exhibits) Referring to Exhibit C, the unit appears to have smaller corrugations on one side than the other. This is illustrated in Fig. 7 of the patent.

However, in Fig. 7 or in any of the figures, I do not notice any reinforcing members or wood members as shown in Exhibit C.

The Court: Are there not wood members also in Exhibit 16 and N?

The Witness: In Exhibit N we only have a cross-sectional [489] opening in the center. Yes, Your Honor, in Exhibit N there are some stiffening members inserted into the mesh at the edge of the unit.

By Mr. Harris:

Q. What do you mean by the "mesh"?

A. Pardon me, inserted into the material, the corrugated material.

Q. So far as the filtering media is concerned, that is found in those three exhibits, Defendants' Exhibits C and N and Plaintiff's Exhibit 16, is that substantially as illustrated in the Kaiser patent?

A. Yes, they are substantially the same.

Q. Referring next to tab 9, which is the Manning patent, No. 2,079,297—

The Court: Just a moment. Where in the text of the specifications does it provide for the direc-

(Testimony of Kenneth F. Russell.)

tion of the airflow—I see, page 1, column 1. Is that the only one?

The Witness: There is another reference on page 1, column 1, line 29 to 32, which shows that the passageways are at an angle to the face of the body.

The Court: Very well. [490]

By Mr. Harris:

Q. Let us turn next to the Manning patent, tab No. 9, Patent No. 2,079,297. Will you briefly describe the construction illustrated in that patent?

A. The unit described here is a filter of the panel filter type. It is a construction similar to that of the Kaiser patent, and the filter element consists of two sections as shown in Fig. 2.

Q. Numbered what?

A. Numbered 15 and 15, 13 and 14, and so on. The two sections, these sections individually, are constructed of parallel layers of corrugated and flat material. The two sections are assembled into a frame, No. 12 of Fig. 2, and they are spaced apart by the reinforcing member 16, which the patent states is to be of expanded material.

The Court: Expanded material?

The Witness: Yes, sir.

By Mr. Harris:

Q. What is the direction of air flow through that device, considering the view, Fig. 2?

A. The air approaches the filter normal to the face and then flows through the passages, depositing dust upon the walls of the filter.

(Testimony of Kenneth F. Russell.)

The Court: Would the air flow be from right to left or from left to right on Fig. 2? [491]

The Witness: In Fig. 2 the air flow could be either right to left or left to right.

The Court: Where is the detail of 16 described?

The Witness: On page 1, column 2, the reference on lines 19 and 20.

The Court: “\* \* \* and stiffening means.”

The Witness: “\* \* \* and stiffening means.”

Then, on Fig. 6, the unit 16 is shown in detail, which is a very enlarged type of expanded metal material.

Mr. Harris: Does Your Honor see the stiffening means 16 in Fig. 6, that is illustrated there? Perhaps Mr. Russell could point that out to the Court.

The Court: I see, yes. Expanded metal or a similar material. It has very large orifices.

The Witness: Yes, these orifices, the size of the orifices is indicated on Fig. 6 on the next page.

The Court: On Fig. 6. I have Fig. 6.

The Witness: Fig. 6, yes, sir.

By Mr. Harris:

Q. What are the alternate corrugated and flat strips or sheets of material 18 and 19 made of, as described in this patent?

A. On page 1, column 2, lines 35 to 40, they are described as paper, flexible and absorbent material.

Q. In your opinion, if these strips 18 and 19, the [492] alternate corrugated and flat strips, were made of wire fly screen, how would the operation of this filter compare with the filter illustrated and described in the '470 patent in suit?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: That is objected to as irrelevant.

The Court: Objection overruled.

A. The operation would be similar.

The Court: Would the result be the same, in your opinion?

The Witness: The result would be substantially the same. It would depend upon tests to determine how close the opening between——

Mr. Leonard S. Lyon: If Your Honor please, I don't think your question or the witness' answer indicates——

The Court: He says it depends upon tests.

Mr. Leonard S. Lyon: Yes, but I don't think it indicates whether the results would be the same as if the Manning patent were using paper or whether the results would be same as in the Farr device. I think that is a very critical thing.

The Court: Well, I suppose this would be made of the same material that the Farr device uses.

Mr. Leonard S. Lyon: Now, the question is, would the results be the same as the results of what, the Farr device or the Manning device with the paper? [493]

The Court: As the Farr. As the Farr.

Mr. Leonard S. Lyon: I wanted that clear. It was not clear in the answer.

The Court: You don't know, is that your answer?

The Witness: I don't know definitely, no.

The Court: You said it would be the same, depending upon tests?

(Testimony of Kenneth F. Russell.)

The Witness: Depending upon tests. The spacing between the two would probably increase the restriction very slightly. However, the efficiency might also be increased, due to that operation.

By Mr. Harris:

Q. What is your opinion on that question?

Mr. Leonard S. Lyon: I don't think his opinion would be any good if he does not know.

Mr. Harris: I think his opinion would be helpful.

The Court: I thought he just got through expressing his opinion that it would be dependent upon factors which he does not know. Is that correct?

Now let me ask you this question: Assuming that the Manning device were made of wire screen material such as used in the Farr patent, do you have an opinion as to whether or not the results would be the same or better or worse than if the Manning patent were made of the material described in the patent? That calls for yes or no. Do you have an opinion? [494] If you have no opinion, say "No," and that is the end of it.

The Witness: Yes, I have an opinion.

The Court: All right. What is your opinion?

The Witness: As I understand the question—May I have the question again?

(The question referred to was read by the reporter as follows:

("Assuming that the Manning device were made of wire screen material such as used in the Farr patent, do you have an opinion as



(Testimony of Kenneth F. Russell.)

to whether or not the results would be the same or better or worse than if the Manning patent were made of the material described in the patent?")

The Court: Do you understand that?

The Witness: Yes, I do.

The Court: That is, the Manning patent follows the specifications and drawings—I mean would follow the specifications and drawings of the Manning patent, only substituting the material of the Farr.

The Witness: My opinion would be that the efficiency would be slightly higher and the restriction might be slightly higher—would be slightly higher.

The Court: The restriction, the pressure loss?

The Witness: The pressure drop through the filter would be slightly higher. [495]

By Mr. Harris:

Q. Now, in which one would it be slightly higher?

A. The efficiency would be slightly higher in the Manning filter if it were constructed as shown, but with the corrugated members, fly screen members of the Farr filter substituted. The restriction would also be very slightly higher, in my opinion.

The Court: The restriction?

The Witness: The pressure drop through the filter would also be slightly higher.

The Court: In other words, it would clog up quicker?

(Testimony of Kenneth F. Russell.)

The Witness: No, Your Honor. The spacing apart would introduce additional turbulence in the region between the elements 15 and 15, where the expanded metal stiffener is located, and that turbulence would introduce a slightly higher pressure drop when the filter were clean.

By Mr. Harris:

Q. Well, now, by "slightly higher," can you give us any quantitative estimate of that?

A. That would be difficult to say.

The Court: Without experiments?

The Witness: Without testing it.

The Court: Have you ever made this device?

The Witness: No, sir. I never made it.

The Court: With either paper or the Farr material? [496]

The Witness: No, Your Honor.

The Court: Have you ever seen it?

The Witness: No, Your Honor. I have never seen this particular type.

The Court: All right.

Mr. Harris: Does Your Honor have any questions further on this Manning construction?

The Court: Not at the moment.

By Mr. Harris:

Q. Proceeding next, Mr. Russell, to tab No. 10, which is the Farr Patent No. 2,286,480, will you describe generally to the Court what is illustrated in this construction?

A. The patent discloses "Air Purifier or Conditioner." On page 1, column 1, lines 2 and 3, it

(Testimony of Kenneth F. Russell.)

states, "the function of which is to remove dust or impurities from air."

Q. How is the filter constructed in this?

A. The unit is a rotary type unit. The filter element of this unit is constructed of strips of corrugated and flat material, spirally wound, as in Fig. 4, about a cylindrical unit 5, a base 5.

Q. What is the direction or orientation of the corrugations relative to the axis of the unit?

A. In Fig. 1 the corrugations are shown to be at an angle, or on a helical form, as shown in Fig. 1.

Q. What is the direction of air flow through this [497] device?

A. As shown in Fig. 1, the air flow approaching the unit is from right to left and, as described in the patent on page 2, column 1, lines 1 to 7 inclusive, the air flow is through the screens.

Q. Is all of the air flow through the screens or does some pass down the corrugations?

A. It states that a certain amount will pass down the corrugations but it states on page 2, column 1, that the screens, the passages "are inclined to the direction of flow, so that while they do deflect to a certain extent the air currents passing through them, a large portion of the air will, by its own momentum, tend to move through the purifier element in a straight line."

Q. Will you compare the device illustrated in Fig. 1 of that patent with the Farr round filter, Defendants' Exhibit D, which I hand you.

A. From an examination of Exhibit D, if the

(Testimony of Kenneth F. Russell.)

filter element in this exhibit were wrapped on a core as it is in Fig. 4, this core shown as No. 5, I would say the construction was the same.

Q. Well, are those corrugations straight through in the Farr '480 patent, or are there any herringbone—

A. In the Exhibit D, it is difficult to see whether there is a herringbone crimp in the unit or not. You cannot [498] see.

The Court: It was testified that there was.

The Witness: Then, there is.

The Court: That there was.

By Mr. Harris:

Q. Other than that?

A. Other than the herringbone—other than the bend in direction in the corrugations and the absence of the core, the device would be similar in construction.

Mr. Harris: I produce a sample of filter media which I ask be marked as Defendants' Exhibit X for identification.

(The device referred to was marked Defendants' Exhibit X for identification.) [499]

By Mr. Harris:

Q. I show you Defendants' Exhibit X for identification and ask you how that compares with the filter media shown in the Farr '480 patent.

A. (Examining exhibit) If the material in the Exhibit X were wrapped in the form of a spiral the construction would be the same as in the patent '480.

(Testimony of Kenneth F. Russell.)

Q. Can you bend that sample into a rough circular form?      A. Yes, I can.

Q. Now when you bend it so are the passages or corrugations straight through the device?

A. No, the corrugations take a helical form.

Mr. Leonard S. Lyon: Your Honor please, it is not clear to me what the witness means by his answer.

Mr. Harris: Counsel can cross-examine him.

Mr. Leonard S. Lyon: I notice three separate sheets of the corrugated material and two separate sheets of the flat material. Is the witness testifying there are five separate sheets altogether in Fig. 4 of Patent '480?

Mr. Harris: We will ask him.

Q. Will you respond to counsel's question? [500]

\* \* \* \* \*

The Witness: No, the intention of the testimony was that if the material as shown in Exhibit X, which consists of alternate layers of flat and crimped screen material, were formed to a spiral form as shown in Fig. 4, the construction would be the same.

By Mr. Harris:

Q. And if they were so formed, would there be a change in direction of the corrugations from one side to the other of the panel?

A. Yes, since they would take a helical form there would be a change in direction.

Q. How does that compare with the construction illustrated in the St. Cyr patent, which is tab No. 1 in Defendants' Exhibit B?

(Testimony of Kenneth F. Russell.)

A. Do you mean the material in Exhibit X?

Q. No, the construction illustrated in this Farr patent, No. '480.

The Court: Exhibit D?

Mr. Harris: No, Your Honor. I think that is the patent in suit. Farr Patent '480 is tab No. 10.

Q. How would the construction of the filter media illustrated there compare with the unit illustrated in the St. Cyr patent? [501]

A. The construction would be similar with the exception that in the '480 patent there is a solid center and in the St. Cyr patent, '237, the spiral is starting at the axis. Otherwise they would be the same. [502]

\* \* \* \* \*

Q. Mr. Russell, referring back to the Farr '480 patent, which is tab 10 in Defendants' Exhibit C, do you have that before you? A. Yes, sir.

Q. Does that patent disclose or does it not disclose the filtering panel operating on the principle of impingement of particles on collecting surfaces?

A. Yes, it does.

Q. Does it disclose such a panel which includes a plurality of mesh screening members extending in the general direction of the intended flow of the medium to be filtered? A. Yes.

Q. Are such members constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered?

A. Yes. [504]

(Testimony of Kenneth F. Russell.)

Q. Do such members form passages extending throughout the filter?      A. Yes.

Q. Are the tunnels of those passages composed of the mesh members?      A. Yes.

Q. Do the passages change direction?

A. Yes.

Q. And in that construction is it arranged so that the medium, the air flow through it, may flow through the mesh of the members near the entrance of the panel when the filter is clean?

A. Yes.

Q. And partially through the passages and thence through the mesh of the members located progressively toward the exit of the panel, as the panel becomes progressively loaded with particles?

A. Yes.

Q. In the '480 patent, are the mesh screen members which you have referred to constructed and arranged to form passages extending through the panel of relatively large size as compared to the openings in the mesh members?      A. Yes.

Q. And do such passages subdivide the panel in both dimensions perpendicular to the general direction of flow of [505] the medium to be filtered?

A. Yes.

Q. Now, referring to tab 11 of the Defendants' Exhibit C, which is the Wood Patent No. 2,252,242—

The Court: Well, before you get to that, on the Farr patent—

Mr. Harris: Yes, Your Honor.

(Testimony of Kenneth F. Russell.)

The Court: On this Farr patent '480, suppose or assume that the embodiment of the Farr patent in suit, as illustrated by Exhibit No.— What is the exhibit number?

Mr. Leonard S. Lyon: Exhibit 2.

The Court: Is this the Farr? No. 4, is this it?

Mr. Harris: Exhibit 2, Your Honor.

The Court: All right. Suppose that Exhibit 2 were used in an air duct to which was introduced water, would the result be the same, by the use of Exhibit 2, as it would by the use of the apparatus exemplified in '480?

The Witness: Do you mean if this device were substituted for the filter in the '480?

The Court: Yes.

The Witness: (Continuing) Would it work the same as described in the '480 patent?

The Court: Would the result be the same, that is to say, would it take out the water from the air as well as the impurities? [506]

The Witness: Yes.

The Court: The result would be the same?

The Witness: It would be substantially the same, yes.

The Court: And how would you do that?

The Witness: In rectangular section?

The Court: In this air filter, Exhibit 2.

The Witness: As I understand the question, I would take that type of construction and form it into a spiral and wrap it around the collar 5.

The Court: No, no. You just install this in an



(Testimony of Kenneth F. Russell.)

area 20 by 20, where you flow air through it, and water.

The Witness: Well, so far as the air going through it, the cleaning out would be the same. Now, so far as the water is concerned, it would depend on how the water was introduced. If the water was sprayed on the surface with a nozzle or something like that, sprayed on it, if the spraying were very heavy and the velocity were high, you might carry some droplets of water on through.

Is that what you mean, sir?

The Court: It isn't what I mean. I am asking you.

The Witness: I mean, does that answer the question?

The Court: It is your answer?

The Witness: Yes.

The Court: Well, one of the objects of this '480 patent is stated to be "to provide an apparatus which will be [507] efficient in operation but which is so constructed as to prevent air-borne drops or particles of water from being carried along into the air stream that is being purified."

The Witness: Yes, it would filter out droplets of water provided the quantity of water was not excessive or it completely flooded it and went on through.

The Court: Well, on the patent in suit, if you desired to embody this into an apparatus which was designed for cleaning air by the filtering method and by the introduction of water, how in the patent

(Testimony of Kenneth F. Russell.)

in suit would you construct such an apparatus, to perform the same result as stated to be intended by patent '480, and without the benefit of patent '480 before you?

The Witness: Well, if it was to remove the dust particles and water particles that were carried in the air stream, I would introduce this in a suitable tunnel and provide means for draining off the surplus liquid that would run down through the screen.

The Court: How much water would you introduce?

The Witness: Would the water be there for the purpose of cleaning?

The Court: I am asking you. I don't know. You said that '480 is the same as the Farr patent in suit. Now, I am asking you, if you construct the patent in suit to perform the same result as '480, and all I want is your statement. [508]

The Witness: Well, that is the way I would construct it. I would take the same construction as used, now, that you have here, and I would introduce that into a duct. And to accomplish the purification of the air, I could either spray a very small amount of liquid upon the unit, by means of a pump and an exterior reservoir, or I could spray a small amount of water upon the unit.

The Court: How would you determine the amount?

The Witness: I would say just that amount that would coat the surfaces and where an excessive

(Testimony of Kenneth F. Russell.)

quantity would not be carried through. I would determine that by tests. [509]

\* \* \* \* \*

Mr. Harris: No, just the application as filed of the Wood patent, No. 2,252,242, is offered into evidence as Defendants' Exhibit Y.

The Court: It is admitted in evidence if there is no objection. (No response.)

(The document referred to was received in evidence and marked Defendants' Exhibit Y.)

By Mr. Harris:

Q. Now, Mr. Russell, will you turn to the Wood patent, [510] tab 11, and describe briefly to the Court the construction illustrated in that patent?

A. The Wood patent shows various embodiments, various forms of air filtering devices. The same filter element is used throughout.

On Fig. 5——

The Court: What is the filter element?

The Witness: Fig. 5 shows the section of the filter element.

The filter element consists of parallel plates of material that have been corrugated and placed adjacent each other and the plane of the plates is in the direction of the air flow.

When this filter element is assembled——

The Court: Just a moment. The plane of the plates is in the direction of the air flow? On Fig. 5, would the air flow be from top to bottom or from right to left?

(Testimony of Kenneth F. Russell.)

The Witness: It is an isometric drawing and it could be either. It could be either in the direction of the line a-a or it could be at right angles to that line.

By Mr. Harris:

Q. What is the direction the corrugations are relative to each other and the adjacent plates?

A. The relation of the corrugations may be at an angle to each other. [511]

When this element is assembled into a panel filter type of unit as shown on Fig. 12 and Fig. 13, the arrangement of the filter element is shown better in that 12 than 13.

The Court: On Fig. 13, the direction of the flow would be d-d, the d at the top?

The Witness: Yes, either from left to right or right to left.

By Mr. Harris:

Q. Now with relation to this filter, what are the corrugated plates made of?

A. On page 7, column 2, lines 23 to 30, he describes the material of the plates as either of sheet metal or similar type of material, such as corrugated paper coated with a viscous oil.

The Court: Is it foraminous?

The Witness: No, sir, it is not. They are solid sheets.

By Mr. Harris:

Q. I show you Defendants' Exhibit A, which is the P-5 obsolete type filter. Will you compare that with the disclosure of the filter panel of the Wood patent?

(Testimony of Kenneth F. Russell.)

A. The filter shown in Exhibit A, if it were constructed of paper or sheet metal, would have a construction similar to the device shown in Fig. 12 of the Wood patent.

The Court: Let me see it.

(The exhibit referred to was passed to the Court.) [512]

By Mr. Harris:

Q. What differences, if any, are there?

A. The difference in this unit is that the material is of screen material instead of paper or sheet metal.

Q. Now referring next to the Kirkham (British) patent, which is tab No. 12, the patent being No. 24,467, will you describe briefly what is illustrated in that patent?

The Court: Before you come to that, take Fig. 3 of the Wood patent on page 2. Is that an embodiment of it in a boiler?

The Witness: That would be what would be commonly called in the air filtering industry an embodiment of the filter in a self-washing oil bath type of unit. I shouldn't say "oil," it would be a suitable liquid to be placed in the sump at the bottom and the air would flow in at the top through the opening No. 17, down through the rectangular opening 11, then through the rectangular opening 51, which is shown in the bottom section of the drawing, then the arrow 98 would show the direction of the air as it is diverted on up to the filter element.

The Court: I cannot find 98.

(Testimony of Kenneth F. Russell.)

The Witness: It is in the lower section on the right-hand side in the cutaway portion of the view. The letter 98 is just to the right of the upper edge, just two numbers down from 51. [513]

The Court: Yes, I see it.

The Witness: That arrow indicates the path of the air.

A suitable liquid is carried in the bottom of the reservoir and the air would pick up some of the liquid and then is diverted toward the entrance to the filter element which is indicated as 27.

The Court: But how does it get from down below up to 27?

The Witness: Well, this unit is in sections, of course, and the upper portion has been separated from the lower portion. The lower portion should be in contact with the flange of the upper portion. They merely drop the cup so that you can see the inside construction.

The internal construction is not too clear, however.

The Court: So it would come back up into 27?

The Witness: Back up through the filtering device 27 and then out through the horizontal outlet 22 which is up near the top of the element.

By Mr. Harris:

Q. What would be the general direction of flow through the filtering device 27?

A. The general direction would be—it is rather hard to describe on Fig. 3—but it would be in at the bottom and out at the top and the flow would be between the plates.

(Testimony of Kenneth F. Russell.)

Q. In that are the plates disclosed parallel to the [514] general direction of flow?

A. Yes, they are. The general plane of the plates are parallel with the flow.

Mr. Harris: Does Your Honor have any further questions on that construction?

The Court: Not right now.

By Mr. Harris:

Q. Turning to the Kirkham (British) patent that I have identified, will you briefly state what is illustrated in that patent?

A. The Kirkham patent shows an improvement in an apparatus for washing and scrubbing gas.

On page 2, line 3, it is referred to as a gas washer or scrubber for filtering gas—correction—it states it is a gas washing and scrubbing apparatus.

This unit is of a rotating construction. The unit consists of a series of parallel discs and each of these discs is made up of a number of segments and the segments in any one section are grouped together as shown in Fig. 2 and Fig. 1.

Q. What are those segments made of?

A. These segments are made of alternate layers of corrugated material or they may have corrugated material with a flat sheet or board placed between the corrugated sheets. [515]

The Court: It says corrugated metal or wire gauze.

The Witness: Yes, Your Honor. That is the type of material.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. What would be the direction of flow going through that device?

A. The direction of flow as indicated is radial on page 2, line 29 and 31.

Q. How are the plates which you have referred to positioned with regard to the direction of flow?

A. The plates of this unit are parallel to the direction of flow and the corrugations on the plates may be at an angle with each other or they may be as shown in Fig. 2.

Q. In your opinion, would that device operate to take dust particles out of the gaseous flow through it?

Mr. Leonard S. Lyon: I would like to ask a question on voir dire, Your Honor.

The Court: Very well.

#### Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a device like the one described in this patent?

A. No, I have not.

Q. You have never made any tests of such a device?

A. No, I have never made any tests. [516]

Mr. Leonard S. Lyon: I object to the opinion, Your Honor, as purely speculative and of no aid to the Court.

The Court: Overruled.



**United States  
Court of Appeals**  
for the Ninth Circuit

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**JULES D. GRATIOT and AIR-MAZE  
CORPORATION,**

**Appellants,**

**vs.**

**FARR COMPANY, a corporation,**

**Appellee.**

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**Transcript of Record**

**In Three Volumes**

**VOLUME II.**

**(Pages 425 to 837, inclusive)**

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**Appeal from the United States District Court  
for the Southern District of California,  
Central Division**

**FILED**

**NOV 25 1952**

**PAUL P. O'BRIEN**



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(Testimony of Kenneth F. Russell.)

Direct Examination—(Continued)

The Court: Will it remove dust particles, was that your question?

Mr. Harris: Yes, any dust particles.

The Court: How does it operate? I cannot tell.

The Witness: The patent is not too complete so far as the entire unit is concerned. They merely describe one segment of a disc that rotates about an axis and this disc is rotating in a bay or tank as described on page 2, line 4.

The Court: Series of discs, and which is the disc? What is the difference between Fig. 2 and Fig. 1?

The Witness: Fig. 1 is a side view of Fig. 2. That is looking at it from the side. Consider Fig. 2 as if you should look at it from the right-hand side and you would see what is shown in Fig. 1.

By Mr. Harris:

Q. What relation does Fig. 2 have to these discs that you are talking about?

A. The discs of the entire unit is not shown in the drawings. Fig. 2 is merely a segment or a bundle of segments which, when bolted to a framework about an axis, forms a disc-like unit. [517]

Q. Like pieces of pie cut in segments?

A. Yes, Fig. 2 would be similar to a piece of pie to the filtering unit.

Q. So if you had the whole disc you would have a number of pieces of segment that were like this around the similar area?           A. Yes.

(Testimony of Kenneth F. Russell.)

The Court: How would this rotate as to Fig. 1?

The Witness: If you continued the line on the left-hand side of Fig. 2——

The Court: So that the flow of water would be through these panels or against the plates here, which I think are called c-c?

The Witness: The unit, as I interpret it, would be one that would rotate into a tank.

The Court: So that these fins——

The Witness: Would be dipped with them as they rotate about.

The Court: The edges of the fins?

The Witness: Yes, or as much of the unit as would be necessary. [518]

If you take Fig. 2 and continue the line on the left and the line on the right and continue them down toward the bottom of the page, they would meet and they would be approximately the center of the shaft. Then, as you add more of these units around the circle, you would complete the entire unit.

The Court: What is Fig. 4? Can that be explained as a right-hand view of Fig. 5?

The Witness: Yes, Figs. 4, 5, and 6 are similar views to Figs. 1, 2, and 3, showing on page 2, line 22——

The Court: 4, 5, and 6?

The Witness: Figs. 4, 5, and 6 are views similar to Figs. 1, 2, and 3, respectively, showing an arrangement wherein a series of corrugated strips are placed between a series of boards or flat plates in

(Testimony of Kenneth F. Russell.)

the device shown in Figs. 1, 2, and 3, that place corrugated pieces together.

In the device shown in Figs. 4, 5, and 6 these corrugated plates are separated by separate plates, sheets of board, or material.

The Court: And in Fig. 1——

The Witness: Fig. 1?

The Court: ——and Fig. 3, the plate strips “a”?

The Witness: In Fig. 1, the figures “b” represent a corrugated strip; that is a side view of it.

The Court: What is “a”? [519]

The Witness: “a” is a corrugated strip with an end view.

Looking on Fig. 2, you will see “b” about the center of the drawing, indicating the corrugations as they are shown here vertically, and upon the same drawing, looking right below that, you will see “a”, which indicates the corrugated plates with corrugations horizontally.

By Mr. Harris:

Q. Now, is there any teaching that the plates may be disposed with the corrugations at any different angle than that shown?

A. Yes. On page 2, lines 38 to 42.

Q. Will you read that to the Court?

A. “As shown in the drawings the corrugations of the sheets a, a and b, b are substantially at right angles to each other; it is to be understood, however, that the corrugations may be arranged at any other angle, it being only necessary that they should

(Testimony of Kenneth F. Russell.)

cross to a sufficient extent to prevent the plates from fitting closely one against the other.”

Mr. Harris: Does Your Honor have any further question on this?

The Court: Not now.

By Mr. Harris:

Q. Next, Mr. Russell, will you turn to tab 13, which is the Row (British) Patent No. 13,222, dated June 11, 1904, and briefly describe to the Court the construction illustrated [520] in that patent?

A. This patent describes an improvement in air filters. The filtering unit is shown in Fig. 1, which is an end view which shows, for instance, the entrance view of the filter.

In Fig. 3 is shown a sectional view down through the middle of Fig. 1.

The unit consists of a series of parallel sheets, and the sheets are in the general direction of the air flow. These form passages through the filter, as illustrated in Fig. 2.

Q. The passages being what?

A. Which is a section taken on a line x-x on Fig. 1.

Pardon me; I did not hear that.

Q. Now, in Fig. 2, what are the sheets that you refer to, what number are they given, or letter?

A. The sheets in Fig. 2 are indicated as “a”.

Q. And what are these passages that you refer to?

A. And the passages between the sheets are indicated as “b”.



(Testimony of Kenneth F. Russell.)

Q. All right. What does this patent say that those sheets may be made of ?

A. On page 2, lines 43 to 49, it states that the sheets may be in the "form of reticulated metal work, but preferably sheets of perforated metal, or sheets of woven wire, or strips or lengths of what is known as 'expanded' metal \* \* \*" [521]

Q. Is there any illustration of such a sheet of woven wire in this patent?

A. Yes. The various metals are shown in views, Fig. 5, Fig. 7, and Fig. 9.

Q. What does Fig. 8 show?

A. Fig. 8 shows an end view of the material in Fig. 7, which shows a unit of woven wire.

Q. Is that corrugated?

A. And the woven wire is corrugated.

Q. How are those corrugations disposed, turning back to Fig. 2?

A. The corrugations are arranged in such an order that they mesh into one another, to form passages that are not straight through.

Q. Where do those passages extend or how do they extend?

A. The passages extend in the general direction of the air flow. The air entering the unit is indicated as the arrows at the lower portion of Fig. 2, and the air flowing out is indicated by arrows at the upper side of Fig. 2.

Q. All right. What is the construction illustrated in Fig. 14?

(Testimony of Kenneth F. Russell.)

A. Fig. 14 shows the same type of plates with the bend near their mid-point, and these sheets are also arranged in parallel and spaced in accordance with the drawing [522] relatively close together.

The Court: Now, you said Fig. 1 is the face of the filter, is it?

The Witness: Yes, Fig. 1.

The Court: In other words, air flows in through the surface, that is, the face of it?

The Witness: That is right. That is the front, exterior view.

The Court: The front. Now, you said in Fig. 2 the openings between the plates are indicated by the letter "b"?

The Witness: Yes, Your Honor.

The Court: In Fig. 1, the letter "b" seems to indicate, tiny holes only on cross-bars, two cross-bars which are disposed, one toward the top and one toward the bottom.

Mr. Harris: Your Honor is right.

The Witness: Your Honor is right.

The Court: What is that?

The Witness: Your Honor is right. I am in error. These units, these parallel plates, are spaced apart, and in order to maintain their spaced relationship, with each other, they have a wavy partition, thus indicated by the letter "b", and in view 1 those are the little dashes that go across up there near the top and also near the bottom of the drawing.

(Testimony of Kenneth F. Russell.)

And in Fig. 2 shows a plan view of those spaces and indicates them as "b", and I mistook those. [523]

The Court: Where does the air get into this apparatus, on Fig. 1, through those little things, dots and dashes on crossbars "b"?

The Witness: No, Your Honor.

The Court: Or along those straight lines running vertical of the drawing, is that where the air flows in?

The Witness: The air flows in between—through the hole between the parallel lines, the vertical parallel lines.

By Mr. Harris:

Q. On Fig. 1, you mean? A. In Fig. 1.

The Court: Then, the plate, that is the material across which the air flows, is illustrated by Fig. 3, is that right? Fig. 3?

The Witness: Yes, that is one. That is a side view of the unit, yes, Your Honor.

The Court: All right. They are straight, they are not corrugated, and the only things that are corrugated are these crossbars "b", one at the top and one at the bottom, to hold the plates apart, is that right?

The Witness: But the plates are also corrugated to the same form.

The Court: Where is the cross-section to the plates?

The Witness: Fig. 2 shows a view which gives both the plan view of the spaces between the plates and the edges of [524] the plates. The lines represent the edge of the plate looking down at it.

(Testimony of Kenneth F. Russell.)

The Court: As if you were looking at it from the top?

The Witness: From the top, if you took it through the lines x-x.

The Court: b, b, those are the spacers?

The Witness: "b" actually indicates the spacer, yes.

The Court: Is that also the plate? Where does it say that in the patent?

The Witness: On page 3, lines 1 to 5, it describes the construction, where it states, "Each sheet or strip is corrugated, fluted or indented longitudinally,"—

Q. (By Mr. Harris): Will you read the rest of that?

A. —or formed to a ridge or V-section, or each sheet is left plain and placed diagonally to the plane of the front edge of the filter, or in such other manner that when assembled the several sheets serve to baffle or deflect the incoming air as well as divide it up into a number of streams."

Q. Now, I hand you a couple of sheets of scrap paper and ask you, if you can, by the use of those two sheets of blank paper, illustrate to the Court how these sheets or plates in the Row patent are generally placed relative to each other.

A. The plates are generally placed parallel to each other. However, the sheets are corrugated, the sheets are corrugated along the edge. [525]

Q. Can you hold the two sheets up and show the Court how they are placed or spaced?

(Testimony of Kenneth F. Russell.)

A. The sheets are spaced by a spacer "b" as indicated by a letter "b" in Fig. 1 here, and also another spacer "b" at the lower part of Fig. 1.

Q. Now, turn the sheets around so the Court can see the edge view of the sheets.

A. And in addition to these sheets being parallel, they are also with the corrugation going vertical.

Q. Where does the air come in?

A. The air flows in between these sheets and then it flows in an undulating manner through the unit, if these sheets are solid. However, it does specify the sheets are of reticulated metal.

The Court: Reticulated?

The Witness: Reticulated, yes.

The Court: Is that foraminous, the same as foraminous?

The Witness: Yes.

The Court: You mean it has got holes in it?

The Witness: It has holes in it, but reticulated metal, as I understand it, indicates a woven material or a criss-cross material.

And a foraminous material quite often has the connotation of perforated or punctured. But they both have holes in them. [526]

By Mr. Harris:

Q. What else may the sheets be made of?

A. The sheets may be of perforated metal, woven wire, or expanded metal.

It further states that the perforations, the mesh or gauge may be varied. This construction is indicated on page 2, lines 43 to 49.

(Testimony of Kenneth F. Russell.)

The Court: They use water in this, is that it? “(e) is the chamber at the top of the plates with finely perforated floor (f)”——

The Witness: There is a liquid used.

The Court: ——“for delivering clean water on to the filter plates, the clean water entering via pipe (h). (g) is the chamber or tray at the bottom of the plates for receiving the water and debris as they fall from the plates and from which they escape through pipe (i).”

Mr. Harris: Mark this, please.

The Clerk: Exhibit Z being marked for identification.

The Court: All right.

(The sketch referred to was marked Defendants’ Exhibit Z for identification.)

The Witness: On page 3, line 17, the description is given of just how the air flows through the unit. [527]

Mr. Harris: In order to illustrate the operation I have marked for identification a sketch which is marked as Defendant’s Exhibit Z.

Q. I hand you a copy of the Defendants’ Exhibit Z, Mr. Russell, together with the Farr Company catalog which is Defendants’ Exhibit E, and ask you to tell the Court what this sketch, Defendants’ Exhibit Z, is, what it shows.

A. The sketch shown on Exhibit Z is made at my direction. It illustrates on the left the Farr catalog in so far as possible, which was copied

(Testimony of Kenneth F. Russell.)  
exactly from the catalog sheet of Farr entitled Exhibit E. On the right is shown a view of the Row (British) patent illustrated in Fig. 2 and illustrates the direction of the air as it flows through this unit.

The arrow No. 1 in both pictures illustrates the approximate airflow where the filter is clean.

The Court: That is, assuming the Row (British) patent to be made out of open wire material or equally foraminous instead of solid material?

The Witness: Right.

The Witness: Right.

The Court: It claims either in the patent, does it not?

The Witness: I am not too sure of that. As I recall the material—page 2, 43 to 49—no, it states that the improved filter consists of any suitable form of reticulated metal work or preferably sheets of perforated metal or sheets [528] of woven wire, and so forth.

The Court: Very well.

The Witness: As I recall the entire specifications are devoted to a reticulated material.

Line 2 in both drawings illustrates the path of the air through these devices and when some material had accumulated.

By Mr. Harris:

Q. What kind of material?

A. This material would be the dirt or dust that had been transported from the air.

Q. Is that shown on the drawings as anything?

(Testimony of Kenneth F. Russell.)

A. That is shown on the drawings by the dark blue marks or deposits in both illustrations.

Q. Now by the heavy dark blue lines you mean what?

A. The heavy dark blue lines. The wavy dark blue lines are the same as in Fig. 2 and they represent the cross-section of the plates themselves.

The specifications state on page 3, line 17 to 19, it states that the air flows through and impinges upon the numerous surfaces and due to the interstices will be blown up into numerous streams, which indicates that the patent also explains the airflow is partially through the screens and partially through the passages between the screens.

Q. Now continuing your explanation of Defendants' Exhibit Z, the sketch, I think you got to the arrow No. 2 on [529] the right-hand picture.

A. No. 3 and No. 4 arrows on both drawings show the result of the loading of the dust as it accumulates on the air flow as the dust has accumulated deeper into the filter.

Mr. Leonard S. Lyon: If Your Honor please, I move to strike the last answer as no foundation laid. There has been no foundation in the testimony for any dust loading of this British device. The witness hasn't laid any foundation that he has ever seen such a device or pointed out it would have a dust loading capacity.

The Court: I think that objection goes to the form of the question. This is his opinion.

Did you ever make one of these?



(Testimony of Kenneth F. Russell.)

The Witness: No, I did not.

The Court: Did you ever see one?

The Witness: I never saw one.

The Court: By the way, this device requires water in its operation, according to the teachings of the patent, does it not?

The Witness: Yes, it uses water to wet the walls of the screen.

The Court: The water is the thing that cleans the air, is it not?

The Witness: The water washes the dirt from the plates and whether the plate—— [530]

The Court: Does it not say in there that it breaks it up into tiny particles, thus washing the air and dropping it to the bottom?

The Witness: I will check on that.

It states that above the filter is a spray pipe or pipes to deliver water into a tray with a perforated bottom through which the bottom is evenly discharged in a number of small streams under the upper parts of the filter.

My interpretation was——

The Court: On line 22 it states that the layer will be more effectively cooled and relieved of all particles of dust. It says here that the water which wets all the exposed surfaces and which is also broken up and given more extended traverse than usual, thus bringing it into more intimate contact with the air. The air will be effectively cooled and relieved of all particles of dust.

In other words, is the water the cleaning agent in this device or is it the plates?

(Testimony of Kenneth F. Russell.)

The Witness: Well, it is the water that is on the plates that is the cleaning agent. If the plates were not there the water would fall immediately to the bottom.

The Court: Is there any viscous material there?

The Witness: No viscous material. The only wetting is the water itself.

The Court: The only wetting is the water itself. [531]

The Witness: Yes, it is from the water itself.

The Court: Well, is this a self-cleaning apparatus?

The Witness: If the unit were sprayed with water and continued to function, it should.

The Court: There would not be any pressure drop then?

The Witness: The pressure drop should not increase.

The Court: In other words, it would not get dirty because the water would continue to clean the plates?

The Witness: That is correct.

Mr. Leonard S. Lyon: That is my objection, Your Honor. The witness started to say this had a comparable dust loading capacity to these other filters, and he laid no foundation to it.

The Court: I take it that his assumption on Exhibit C is that there would be no water introduced into this.

The Witness: That is correct.

The Court: If there were no water introduced into the flow or through then the air flow would be

(Testimony of Kenneth F. Russell.)

as here and there would not be an accumulation of dust?

The Witness: These would be the regions where the dust would tend to deposit.

The Court: In your opinion?

The Witness: In my opinion.

By Mr. Harris:

Q. Now, Mr. Russell, will you clarify this question [532] of water or oil? Will you compare the use of water or oil in panel type filters so far as just purification is concerned?

The Court: You mean oil introduced through pipe H into tank E and withdrawn through tank G in the British patent?

Mr. Harris: No, Your Honor. I was first going to ask him to compare the use of water as a wetting agent and oil as a wetting agent in any of these panel type filters, the Farr filter or the Air-Maze filter or the Vortox filter or any of them.

Q. What is the difference, if any, in the operation of water or oil or any other liquid?

Mr. Leonard S. Lyon: I object to that on the ground that there is no foundation laid. The witness hasn't laid a foundation for an opinion or stated that he had an opinion.

By Mr. Harris:

Q. Do you have any opinion?

Mr. Leonard S. Lyon: Nor what it is based on.

The Witness: Yes, I have an opinion.

Mr. Leonard S. Lyon: I would like to know what it is based on.

Mr. Harris: Let us get the opinion first and then we can ask him.

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: I would like to know what it is based on to see if it is admissible. [533]

The Court: I would not understand it if he expressed his opinion because your question is not postulated on the proposition that oil shall be used the same as water in these cleaning devices. If oil is used the same as water, then if he expresses his opinion it will mean something. If oil is used in a different fashion, that is for merely soaking the paper, such as is done in one of the exhibits, or coating the material, then his opinion would be something else.

By Mr. Harris:

Q. If oil and water are used in the same manner in one of these panel type filters, such as the Farr filter in suit, the Air-Maze filter or any of the others, what would be the comparable results so far as air cleaning was concerned?

Mr. Leonard S. Lyon: I object to that on the ground there is no foundation laid that they could be or have been or that the witness has any knowledge concerning this.

The Court: If he has an opinion—have you ever experimented or tried it?

The Witness: Not in regard to panel filters but using our type of filter element in oil bath units, why, yes, I have observed the action of water and oil.

The Court: If I understand the testimony correctly in this case, the only use of oil in a panel filter unit such as the Farr unit and the Defendants'

(Testimony of Kenneth F. Russell.)

Exhibit P-5 is to coat the material, is that correct?

The Witness: That is correct.

The Court: Now assume that, assume that you washed all that oil off of those elements, or whatever you call them, and coated it with water, would your result be the same? I mean if you just dipped it in water.

The Witness: It would have to be instantaneous because the water would evaporate rather rapidly.

The Court: In other words, you would have to have a continuous water bath?

The Witness: You would have to supply it continuously.

The Court: Then the water would clean the air and clean the filter?

The Witness: Yes.

The Court: And then you would not have any pressure drop?

The Witness: You would not have any increase in pressure drop.

The Court: And you would have more expense in operation?

The Witness: There would be more expense in operation.

The Court: Because you would have to get a water supply and keep it pumping?

The Witness: Yes. [535]

\* \* \* \* \*

Mr. Leonard S. Lyon: Your Honor, I have the following to be added to Exhibit 17, in accordance with the previous record: a copy of the judgment,

(Testimony of Kenneth F. Russell.)

a copy of the complaint, and a copy of the answer. I ask that they be made part of Exhibit 17.

The findings of fact and the order for the judgment are already part of Exhibit 17.

The Court: Very well. All right.

Mr. Harris: Next, if the Court please, Mr. Watterson, who testified several days ago, calls my attention to an error in the transcribing of some of his testimony, which he would like to have corrected. That is on page 393 of the record, line 20 of that date. The words "air resistance" should be "arrestance," and, with the consent of counsel, may we correct it at line 20? "Air resistance" should be "arrestance." [540]

\* \* \* \* \*

The Court: All right. If that is what the witness wants to say.

Mr. Leonard S. Lyon: Do you want to use it twice? It is in line 19 and line 20.

The Court: " \* \* \* that showed as low initial resistance"——

Mr. Harris: No. That is a different thing he is talking about.

The Court: " \* \* \* nor have I seen anywhere the"——

Mr. Harris: The arrestance. You will see, if you read the next sentence, "They invariably will slope upward as the [541] dirt loads up the filter and the efficiency increases." That ties in with "arrestance" and not "air resistance."

The Court: Very well.

KENNETH F. RUSSELL

resumed the stand on behalf of the defendants and, having been previously duly sworn, testified further as follows:

The Court: You have finished with the Kirkham patent, have you?

Mr. Harris: First I want to go back to the Manning patent, which is tab No. 9.

Direct Examination—(Continued)

By Mr. Harris:

Q. Mr. Russell, yesterday there was some colloquy and some questions asked by the Court and by myself relative to the Manning patent. At page 495 of the record, the Court asked you this question:

“That is, the Manning patent follows the specifications and drawings—I mean would follow the specifications and drawings of the Manning patent, only substituting the material of the Farr.

“The Witness: My opinion would be that the efficiency would be slightly higher and the restriction might be slightly higher—would be slightly higher.

“The Court: The restriction, the pressure loss?

“The Witness: The pressure drop through the filter would be slightly higher.”

Then, continuing on page 496, the first few questions and answers, would you explain what you had in mind when you gave your answers to those questions.

(Testimony of Kenneth F. Russell.)

A. What I had in mind was that, if the Manning—it is rather involved—if the Manning filter were constructed of fly screen as used in the Farr filter, the '479 patent, that the efficiency would be higher and the restriction to the air flow would be higher than the Farr filter. I apparently misunderstood or misinterpreted the question.

The Court: That is what you meant by “resistance”?

The Witness: “Resistance” in place of “restriction.”

The Court: Yes.

The Witness: Yes.

The Court: They mean the same thing?

The Witness: They mean the same thing.

The Court: That is what I understood you to mean. [543]

By Mr. Harris:

Q. What would your answer be in answer to the question of the Court relative to the comparison between the Manning device made out of paper and the Manning device made out of fly screen?

A. The Manning device——

Mr. Leonard S. Lyon: I object to that as no foundation laid.

The Court: That is just what he was talking about.

Mr. Harris: No, Your Honor.

May I explain this a bit? Over on page 492 of the record at the bottom of the page, line 25, I asked a question:



(Testimony of Kenneth F. Russell.)

“Q. In your opinion, if these strips 18 and 19, the alternate corrugated and flat strips, were made of wire fly screen, how would the operation of this filter compare with the filter illustrated and described in the '479 patent in suit?”

Now following that we got off on some colloquy there and then Your Honor asked a question, the import of which was to compare the Manning patent with and without fly screen, and that is what the witness answered.

I wanted to clarify that here now so as to answer Your Honor's question the way the witness desires to answer it and not the answer which he gave to the question I asked [544] which he understood Your Honor to ask but which was incorrect.

The Court: You just asked him that question and he answered it again.

Mr. Harris: Yes. Now I want an answer to Your Honor's question.

The Court: He answered: The efficiency would be slightly higher and the restriction might be slightly higher. Now he says restriction and resistance to the air.

The Witness: Yes, Your Honor. I said that the efficiency would be slightly higher and the restriction or resistance to the air would be slightly higher than the Farr filter.

The Court: Than the Farr filter?

The Witness: Than the Farr filter. That is where I got off on the wrong track.

(Testimony of Kenneth F. Russell.)

The Court: I understood you to say that it would be slightly higher than the Manning filter made out of paper.

Mr. Harris: That is what he did say, but he was thinking that Your Honor was asking the question which I had previously asked.

Q. Now what is your answer to His Honor's question?

A. May I have the question?

Q. I will read it.

Mr. Leonard S. Lyon: Your Honor please—I will wait until you have read the question. [545]  
By Mr. Harris:

Q. Here is the question——

The Court: “Assuming that the Manning device were made of wire screen material such as used in the Farr patent, do you have an opinion as to whether or not the results would be the same or better or worse than if the Manning patent were made of the material described in the patent?” That was my question.

\* \* \* \* \*

The Witness: If the Manning filter were constructed of fly screen then the efficiency would be slightly higher than [546] if constructed of paper and the restriction would be about the same. It could possibly be slightly lower or higher. I wouldn't know definitely without test.

By Mr. Harris:

Q. Now referring to the Wood patent, which is tab 11 in Defendants' Exhibit C, will you state

(Testimony of Kenneth F. Russell.)

what that patent teaches as to the use of oil or water in a panel type filter?

A. The Wood patent teaches on page 7, first on lines 23 to 30——

Q. What column?

A. Page 7, column 2, lines 23 to 30, it states:

“The baffle plates may be of corrugated paper coated with a viscous oil or other viscous material. Where the filter unit is to be discarded after use or the baffles may be of sheet metal, for example, sheet copper, where the unit is used and then washed and recoated with viscous material for reuse in the system or when the unit is continuously flushed with an oil or water spray \* \* \* ”

The patent goes on to state or teach, on the same page, page 7, column 2, lines 52 to 71:

“For the throwaway type of the permanently coated unit the surface of the corrugations may also be coated with a mucilaginous compound composed of gum, water and a microscopic agent [547] capable of drawing water from the air so as to maintain the coating moist may be used. Where the unit is permanent the coating can be flushed off when it becomes loaded with dirt and recoated by spraying or dipping for the next period of operation. In some instances I prefer to use a continuous spray or drip of oil or water in the unit to provide the desired viscous coating, and also to flush the collected dirt into a sump. For such installations a spray or drip of oil or water is applied continuously to the upstream face of the unit when

(Testimony of Kenneth F. Russell.)

the latter is in the vertical position and the residue permitted to drip from the base of the unit into a sump. A recirculation of the oil or water may be afforded if desired by using a suitable pump."

Q. Now will you summarize what that means to you as to the relative use of oil or water in such a filter?

A. To me that indicates that water or oil may be interchanged as a coating on a filter element so far as trapping the dust particles that are carried in the air.

I believe it also indicates that the water has an additional function to wash away that coating if the water is supplied in sufficient quantities.

Q. Would you say that the action of such oil and water [548] is the same or different?

Mr. Leonard S. Lyon: I object to that. There is no foundation laid.

Mr. Harris: I will ask that, based upon your experience.

Q. What experience, if any, have you had, Mr. Russell, with the use of oil and water in air filters or cleaners?

A. I have had some experience in air cleaners where we have substituted water for oil and we have found the functioning to be very similar.

\* \* \* \* \*

The Witness: The air cleaners that I have in mind or that I am talking about are those cleaners where we use the same type of filter element as we do in our panel filters.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. In your panel filters, are they oil coated?

A. Yes, we recommend that they be oil coated.

Q. Such as illustrated by the Defendants' Exhibits S and T in evidence here? [549]

A. That type of filter, yes.

Q. And what is the action of the oil in those filters so far as dust removal is concerned?

A. The surface of the oil is that upon which the dust impinges. The oil is to take the dirt out of the air.

Q. Now referring to the Row (British) patent, tab 13 in Exhibit C, what is the function of the water used in that patent?

A. The function of the water in the Row patent—first, the application of the water is described on page 3, lines 9 to 15, where it states that the water is sprayed onto the upper parts of the filter, and the purpose of the water here is to provide a surface to which the dust can adhere after it has impinged, and it also has a second function in this patent of washing the dirt off of these filter elements down into a sump.

Q. Now in the Row patent, referring to Fig. 2 of the drawings, what does the patent say about the flow of air through the device, and by that I mean does it indicate whether the air flows down between the corrugations or does it flow through the screens, or how does it flow according to the patent?

A. The patent, on page 3, line 17, indicates that the air flows through the screens. The arrows on

(Testimony of Kenneth F. Russell.)

Fig. 2 indicate that some of the air flows, at least some of the air flows, [550] along the passages or along the surfaces of the screen.

Mr. Harris: Does your Honor have any further questions on the Row patent at this time?

The Court: Not at this time.

By Mr. Harris:

Q. Mr. Russell, will you turn next to the Moller (British) patent, tab 14, being Patent No. 211,756, and briefly describe the device illustrated there?

A. This device is titled "Improvement in or Relating to Air Filters." The device is shown on Fig. 1 and Fig. 2. It is an air filter, as stated on page 1, column 1, line 11: "This invention has reference to air filters."

It is in the form of a belt or chain type of unit and consists of a series or a number of sections, indicated as K in Fig. 1, which are connected together to form this belt or chain. The unit moves over a drum at the top of Fig. 2 and also around a drum, around the bottom of Fig. 2.

The air flow is indicated on drawing 2 as from left to right, which would be on Fig. 1 perpendicular to the face as it is shown there.

The patent goes on to describe and illustrate the individual sections K, the construction of the individual sections K, and these sections consist of numerous plates and these plates are parallel to the air flow.

The individual plates are shown on Fig. 3 and 4 and the [551] drawings and specifications also in-

(Testimony of Kenneth F. Russell.)

dicating that the plates are formed on so as to produce projections or corrugations.

Q. What is the form of those corrugations?

A. These corrugations are V-shaped, as may be seen in Fig. 3 and 4. They are indicated as F.

Q. How are those plates assembled?

A. These plates are assembled immediately adjacent to each other, and on page 1, column 2, line 58 to 64, it indicates that the plates are reversed end to end so that the V-shaped projections, or the V of the projections, are in opposite directions.

This of course prevents the plates from nesting and provides a space between plates for the air passage.

Q. How does that compare with the filter media of the Air-Maze P-5 construction as illustrated by Plaintiff's Exhibit 6?

The Court: How does what compare, the plate?

Mr. Harris: The disclosure of this patent, the way the plates are assembled.

The Court: The way the plates are assembled or the plates themselves or the whole things?

Mr. Harris: The way the plates are assembled first.

Mr. Leonard S. Lyon: I don't think the witness has described how they are assembled.

The Court: It is not clear to me yet just how they are [552] assembled.

By Mr. Harris:

Q. Will you describe that in some more detail, Mr. Russell?

(Testimony of Kenneth F. Russell.)

The Court: He says that Fig. 5 shows a chain link inside view.

The Witness: Fig. 5 is an enlarged view of a section of a portion of this section indicated as—well, one of the sections such as indicated by K in Fig. 1.

The view in Fig. 5 shows the plate shown in Fig. 3 and Fig. 4 placed together with what I would call hinge pins at top and bottom.

By Mr. Harris:

Q. Lettered what?

A. These are lettered D-D and D.

The plates are assembled, enough of them are assembled together—there are only a few shown in Fig. 5 but enough are assembled—to completely cover the opening in this filter unit. That is completely across Fig. 1 as shown by the small vertical lines. Each line there represents one plate. Each little vertical line represents one plate.

Q. Well, now, again how are the plates shown in Fig. 3 and 4 assembled relative to each other?

The Court: Alternating, he said.

The Witness: They are placed side by side.

The Court: Side by side?

The Witness: With the corrugations of one touching the adjacent plate.

The Court: That would be on top of one another, would it not?

The Witness: Yes. Looking at it this way, it would be (illustrating), but they are assembled in a manner across like this and the air flows through here.



(Testimony of Kenneth F. Russell.)

The Court: The air flows how?

The Witness: The air flows between the plates. They are spaced, numerous of these plates are spaced across as shown in Fig. 1. Then there is a hinge pin across the top and a hinge pin across the bottom and the entire unit acts as a belt. It travels up over the drum at the top.

By Mr. Harris:

Q. What is the direction of air flow relative to the direction of the plates?

A. Generally it is parallel to the plates, the general direction. However, it is diverted by the corrugations so it is a tortuous path. [554]

The Court: And in operation, the link chain filters dip down into a pan of water?

The Witness: Into a liquid, and this liquid will coat the plates so that they have a surface adapted to hold the dust particles.

The Court: What does it say in the patent? “\* \* \* such projections constituting pockets or troughs for collecting a suitable wetting and dust retaining adhesive liquid,”——

Mr. Leonard S. Lyon: Page 2, line 22, in the first column, your Honor.

The Court: Yes.

The Witness: Also page 1, column 1, line 40, and so on.

By Mr. Harris:

Q. Is that link chain construction designed to be moved fast or slowly?

(Testimony of Kenneth F. Russell.)

A. As I recall it, it doesn't state specifically in the patent, but, from my experience, my opinion would be that it would move relatively slow.

Q. Now, what is the purpose of making the plates, assembling them so that the plates are heringbone and then reversing the alternate plate?

The Court: He says the purpose of it is "for collecting and for scooping up the wetting liquid in the receding angles of the V."

By Mr. Harris: [555]

Q. What does the patent say about that, Mr. Russell?

The Court: Page 1, line 30?

A. On page 1, lines 30 to 35:

"In accordance with the invention these small aminary plates are provided with projections arranged at an angle to the direction of the air current, and forming obstructions by means of which repeated deviations of the paths of the current is produced,"——

By Mr. Harris:

Q. Now, in your opinion, if this device were made of wire fly screen, if these plates were made of wire fly screen instead of perforated metal plates, how would the operation of that device compare with the operation of the Air-Maze P-5 panel?

Mr. Leonard S. Lyon: If your Honor please, may I have voir dire on this?

The Court: Yes.

(Testimony of Kenneth F. Russell.)

Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a device constructed or operated according to the disclosures of this patent, tab No. 14?

A. In its identical construction, no.

Q. Can you tell us from this patent how fast this endless chain moves in the operation of the device?

The Court: From the patent? [556]

Mr. Leonard S. Lyon: Yes.

A. No. As I said before, I do not recall of any reference to the speed, the exact speed, of the device.

The Court: Well, does it say fast or slow, or does it say anything about the speed?

The Witness: I don't recall a reference to it.

The Court: As a matter of fact, it doesn't, does it?

The Witness: I don't think it does.

By Mr. Leonard S. Lyon:

Q. Now, it says at line 25 on page 2, column 1, "pockets or troughs for collecting and for scooping up the wetting liquid in the receding angles of the V." Can you tell us from the patent how full those V's are in the normal operation of this device?

A. I don't understand what you mean by "how full." Do you mean when they immediately leave the liquid or when they go up over the top?

Q. Are they full of water when they go up?

(Testimony of Kenneth F. Russell.)

A. As they go up to the top, depending on how tight the plates are. The patent doesn't distinctly show there.

Q. Could you tell from the patented filter?

A. No. I couldn't tell from the patent.

\* \* \* \* \* [557]

By Mr. Harris:

Q. Well, Mr. Russell, I will ask you that. Couldn't the plates illustrated in Figs. 3 and 4 of the Moller patent [558] be formed out of wire fly screen?

Mr. Leonard S. Lyon: The same objection.

The Court: Objection overruled. In his opinion.

A. In my opinion, the plates could be formed out of fly screen, yes.

By Mr. Harris:

Q. And could they be assembled, if so formed, in the manner illustrated in this patent?

Mr. Leonard S. Lyon: The same objection.

The Court: Objection overruled.

A. In my opinion, yes, they could be assembled in this manner.

By Mr. Harris:

Q. Now, if they are so formed or assembled, what is your opinion as to the comparative operation of this device so far as removing dust from the air, and the operation of the Air-Maze P-5 panel in suit?

Mr. Leonard S. Lyon: The same objection.

The Court: Objection overruled.

A. The operation would be similar to that of the

(Testimony of Kenneth F. Russell.)

patent shown in Exhibit 6, which I understand is the P-5 filter in question.

The Court: Well, do you have an opinion as to how long these screen wires or this screen material would last, by being subjected to the screen running over the drum, possibly? [559]

The Witness: There would be a question as to the life of it. I don't think they last too long, unless they are reinforced either at the top or the bottom of the hinges, so far as the matter of construction is concerned.

Mr. Harris: I produce a certified copy of a translation of the French patent to Niestle, No. 739,956, which I ask be marked for identification as Defendants' Exhibit AA.

(Said document was marked Defendants' Exhibit AA for identification.)

\* \* \* \* \*

The Court: All right.

(The document referred to, marked Defendants' Exhibit AA, was received in evidence.)

[Printer's Note: Defendants' Exhibit AA is reproduced in Book of Exhibits.]

By Mr. Harris:

Q. Now, Mr. Russell, will you turn to the Niestle patent and the translation that is found in the prior-art [560] book, Defendant's Exhibit B, and briefly describe that to the Court?

A. The Niestle patent describes a filter for removing dust from gases. It is shown in Fig. 1—

(Testimony of Kenneth F. Russell.)

section of the filter is shown in Fig. 1, and an alternate construction is shown in Fig. 5.

The filter is constructed with three air passages from the upstream to the downstream and, considering the form shown in Fig. 1, the filtering element is fabricated from sheets of material and so arranged and in such a manner that they form passages as shown by the dotted lines  $4^1$  and  $4^2$ . The sheets that I spoke of, and that had been fabricated in this manner, are indicated as  $3^1$ . The second sheet is  $3^2$ ,  $3^3$ , and  $3^4$ .

The embodiment shown in Fig. 5 shows a different relation of these elements of the filter, these sheets of the filter. They have been arranged to form—the passages, for instance,  $3^1$  and  $3^2$  have been assembled in the same direction to increase the length of the passage before the bend is made.

Figure  $3^3$  and  $3^4$  shows the unit reversed, to give a change in direction of the air flow.

Q. What are the dotted lines with the arrows on them in Figs. 1 and 2?

A. The dotted lines in Fig. 1, with the arrows on them,  $4^1$  and  $4^2$ —just the dotted lines—I am sorry. [561] Correction.  $4^1$  and  $4^2$  refer to an element of the screen.

The dotted lines refer to the direction of the passages.

Q. What is shown in Figs. 6, 7, and 8?

A. Fig. 6, Fig. 7, and Fig. 8 show the sheets of material before they have been formed. It merely shows them. For instance, Fig. 6 shows a wire

(Testimony of Kenneth F. Russell.)

screen material or a wire gauze material as described—as shown in the patent, metal gauze.

\* \* \* \* \*

The Witness: The material shown in Fig 6 is described in the patent as metal gauze.

The Court: Whereabouts?

The Witness: On page 5.

Mr. Leonard S. Lyon: Is that the translation?

The Witness: Of the translation, yes. Page 5, paragraph 2, “In particular, according to one embodiment of the elements 3<sup>1</sup>, 3<sup>2</sup> are cut out and pressed in a metal gauze 6 (Fig. 6).”

Mr. Harris: I produce a sheet of material which I ask be marked as Defendant’s Exhibit BB.

(Said material was marked Defendants’ Exhibit BB for identification.)

The Court: The patent says, “The meshes of the metal gauze may be fine enough for the liquid, such as oil, applied thereon to fill the meshes by capillary action and form a continuous, thick film of oil, favoring the deposition of the dust suspended in the gas.”

The Witness: Yes, your Honor.

The Court: Does it or does it not state that the openings in the gauze should be small enough so that when dipped in oil they form a solid plate composed of the screen and the oil filling the holes?

The Witness: As described there, it does. .

By Mr. Harris:

Q. Does the specification indicate that it necessarily is so formed?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: I object, your Honor, unless the witness can point to it.

The Court: Objection sustained.

By Mr. Harris:

Q. I show you Defendants' Exhibit BB. [563]

The Court: What was AA?

Mr. Harris: A certified copy of the French patent.

The Court: Oh, yes.

By Mr. Harris:

Q. Will you identify that exhibit, Mr. Russell?

A. Exhibit BB illustrates the sheet shown in Fig. 6 of the patent.

Mr. Harris: Next I produce another sheet of material.

The Court: Have you seen it?

Mr. Leonard S. Lyon: Yes, sir, I have, your Honor.

Mr. Harris: Which I ask be marked as Defendants' Exhibit CC.

(Said sheet of material was marked Defendants' Exhibit CC for identification.)

The Court: Of what gauge, or how would you describe this Exhibit BB, how many perforations to the inch?

The Witness: I would assume this was approximately 30 openings to the inch.

The Court: No. 30 gauze, you call it wire gauze. All right.

By Mr. Harris:

Q. I will show this to counsel first, and then I



(Testimony of Kenneth F. Russell.)

show you Exhibit CC for identification. Will you identify that, Mr. Russell?

A. Exhibit CC illustrates the material as it is formed [564] and shown in Fig. 1 as, for instance, the element 3<sup>1</sup>, or shown in Fig. 2 and Fig 3 in a side and an end view.

Mr. Harris: Exhibit BB is offered into evidence to illustrate the witness' testimony.

\* \* \* \* \* [565]

The Court: The objection is overruled. It is admitted.

(The article referred to was received in evidence and marked Defendants' Exhibit BB.)

Mr. Harris: The next one we offer is the expanded metal Exhibit CC as Defendants' Exhibit of the same number.

The Court: Admitted.

Mr. Leonard S. Lyon: Same objection, your Honor.

The Court: Same ruling.

(The article referred to was received in evidence and marked Defendants' Exhibit CC.)

Mr. Harris: I have here another model which I think plaintiff's counsel have seen previously, but I will let them inspect it again.

(Exhibiting device to counsel.)

By Mr. Harris:

Q. This has been marked as Defendants' Exhibit DD, Mr. Russell. Would you identify that?

(Testimony of Kenneth F. Russell.)

The Court: I do not understand your answer to the last question concerning CC, before we get to that. The patent says the meshes may be fine enough with a liquid such as oil applied thereon to fill the meshes by capillary traction for [566] a continuous thick film of oil. In other words, the meshes would be filled but these slips would remain open?

The Witness: Yes, your Honor.

The meshes would be in actual practice—it would be my opinion—that whether the meshes were filled with oil would depend upon the temperature of the oil and the viscosity that was used.

The Court: It says to fill it so that the meshes will be filled.

The Witness: But that would be the fine mesh, of course, and not the opening that they are referring to.

Mr. Harris: It says they may be. It does not say they have to, if I may call your Honor's attention to that.

The Court: I see.

\* \* \* \* \*

By Mr. Harris:

Q. Mr. Russell, will you now identify the Exhibit DD.

A. Exhibit DD illustrates the device as shown in Fig. 5.

Q. Of the Niestle patent? [567]

A. Of the Niestle patent.

Q. And will you point out what it includes so far as the wire screen members are concerned?

(Testimony of Kenneth F. Russell.)

A. It includes several sheets of the material fabricated as described in the patent and assembled so as to form passages having walls of a mesh material.

Mr. Leonard S. Lyon: Your Honor please, may I understand if the witness is testifying that this Niestle patent describes the use of the material in Exhibit DD? He said so but I don't think he meant to and I don't want to encumber the record.

The Court: That will encumber the record?

Mr. Leonard S. Lyon: Yes, already heavily encumbered.

I would like to know if the witness means to testify that the Niestle patent describes the use of wire screen such as in Exhibit DD.

The Court: I thought that is what he testified to.

You said that is built according to the teachings of the Niestle patent?

The Witness: I said this device illustrates the embodiment——

Mr. Leonard S. Lyon: You said the material described in the patent.

The Witness: I said this device, the particular device that I am talking about, DD, illustrates the embodiment of [568] the invention that is shown in Fig. 5 of the Niestle patent.

Mr. Leonard S. Lyon: I object to that as a legal conclusion rather than a statement of fact.

The Court: It is his opinion. He is an expert.  
By Mr. Harris:

Q. Now as to the device illustrated in Fig. 5 of the Niestle patent, and described in the Niestle

(Testimony of Kenneth F. Russell.)

patent, are there or are there not passages which extend from front to back or from front face to rear face of that filter device?

A. Yes, there are.

Q. Do those passages subdivide the flow of fluid, in your opinion, in both dimensions perpendicular in the general direction of flow?

A. Yes, they do.

Q. In your opinion, in the Niestle construction are the passages so constructed and arranged that as the mesh members become progressively clogged the medium to be filtered may flow through such passages and encounter unclogged mesh members?

A. Yes.

Q. In your opinion, in the Niestle construction do the passages through the filter from front to back change in direction as they pass through the filter? A. Yes.

Q. Are such changes in direction abrupt? [569]

A. Yes, the changes are abrupt. They are as abrupt as shown and described in the '479 patent.

Q. Now based upon your experience in the air filter art, please state your opinion as to how the air would flow through the device illustrated in the Niestle patent.

Mr. Leonard S. Lyon: I object to that, Your Honor, and I would like to have a voir dire.

The Court: Yes.

Mr. Leonard S. Lyon: Have you ever seen a device or tested a device such as illustrated in the Niestle patent?

The Witness: No.

(Testimony of Kenneth F. Russell.)

Mr. Harris: Seen or tested, was that the question?

Mr. Leonard S. Lyon: Yes.

The Witness: I have seen the model.

The Court: That is this model?

The Witness: Yes.

Mr. Leonard S. Lyon: Have you tested that model?

The Witness: I have never tested that model.

The Court: Is this built according to the teachings of the patent? What are all these little wells in here. I have been trying to find out how there is one continuous sheet of this material, and it does not appear to have any. They are welded together some place. Is that what those welds are?

The Witness: Yes.

The Court: Where is the one sheet in this model here [570] that goes across such as is shown here in Fig. 6 or like BB or CC?

The Witness: If you look at the model in this manner (indicating), this would represent the view of Fig. 5 and this would be the left side and this would be the right side, and the dotted arrows shown there would be through here and through here. (Indicating.)

The Court: You have all that on the end, but that is not one piece of metal.

The Witness: The one sheet of metal consists of from this point to the left. It is one sheet of metal from there. The sheet of metal from here—this is from here to here—and that is the second sheet,

(Testimony of Kenneth F. Russell.)

and the third sheet is this material here, the fourth sheet is this section here, and this consists of five sheets, as I read it.

The Court: Is that big enough to test for practical purposes?

The Witness: In my opinion, no. [571]

\* \* \* \* \*

By Mr. Harris:

Q. Does it make any difference, Mr. Russell, which one of these various materials illustrated in the patent are used so far as the air flow is concerned?      A. To a degree, it would. [572]

\* \* \* \* \*

The Court: By the way, in that Exhibit DD, is the screening material or media the same as Exhibit CC and BB?

The Witness: I would have to examine them, sir, to see.

The Court: Or is that 14 mesh?

The Witness: No, this is not 14 mesh. This is about 16 mesh in one direction, about 16 x 16, or 18 x 18, somewhere below 20.

By Mr. Harris:

Q. You are referring to Exhibit DD?

A. I am referring to Exhibit DD. [574]

\* \* \* \* \*

Mr. Harris: Very well.

Q. Mr. Russell, assuming that the device in the Niestle patent is made of wire gauze as described in the patent, will you explain your opinion as to the nature of the flow of air through that device?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: I object to that as no foundation laid, also as failing to state whether or not the perforations in the wire gauze, the meshes of the wire gauze, are fine enough so that the liquid or oil applied there to fill the meshes and form a continuous thick film of oil.

The Court: You can cross-examine him on that when you get to it. He has a right to frame his question according to his theory and as long as it is approximately fair—and it is—the objection is overruled.

The Witness: The answer would be that some of the air would flow through the screens and some of it would flow along the surface of the screens.  
By Mr. Harris:

Q. What is your opinion as to the deposition of dust during that air flow?

Mr. Leonard S. Lyon: Same objection.

The Court: If the screen holes were filled with oil [575] so that the air could not get through, would it flow through the screen?

The Witness: There is a fine point there. I was assuming—the patent says that it may be fine enough for the liquid such as oil and applied thereon to fill the meshes. If the screens were so fine, you could get it so fine, and he used a very thick and heavy oil, then obviously if the screens were filled and the pressure drop, the velocity of the air was not great enough to break open those openings, then all of the air would flow along the surfaces of the screens.

(Testimony of Kenneth F. Russell.)

The Court: And the passages?

The Witness: Along through the passages.

The Court: Rather than through the openings of the screen?

The Witness: Yes, sir. But since I base my answer upon the fact that since it says that it may be fine enough for the liquid, I was assuming that we might use in this unit an oil of a viscosity similar to that being used at the present time on other panel filters, such as this oil that was described in our tests, and it doesn't specify in the patent the exact mesh of the gauze and with the latitude that is allowed there you can go from one extreme to the other. If you have a solid impervious wall of oil that cannot be disturbed then the airflow would be through the passages. If [576] the openings of the mesh were allowed, if you went to the other leeway in the patent and used a little larger mesh, and you used a viscosity of oil that we are using at the present time, then the answer I made was based upon that. [577]

\* \* \* \* \*

### Cross-Examination

By Mr. Leonard S. Lyon:

Q. Mr. Russell, you have testified that you know of no agreement between Air-Maze and your company. Have you any agreement with Air-Maze?

A. No. I have no agreement with Air-Maze.

Q. Do you expect to be paid for testifying in this case?      A. I hope so.

Q. Well, whom do you expect to be paid by?



(Testimony of Kenneth F. Russell.)

A. The connection I have had is with Mr. Harris.

Mr. Harris: We will stipulate that Air-Maze is going to pay him for his services here. [578]

\* \* \* \* \*

The Court: What is the bulk of your business?

The Witness: The bulk of our business is in oil bath, air cleaners for heavy-duty equipment such as ordnance tanks, large engines built by Cooper, Bessemer, and Clark Brothers, and that sort of thing, and used by Le Tourneau, and so on.

By Mr. Leonard S. Lyon:

Q. Is your answer the same as to filters like Exhibit S which you say are competitive with the Airkleen device of Air-Maze?

Mr. Harris: "Airkleen" device?

A. I don't know of an Airkleen device.

Mr. Harris: You mean clean-air device?

Mr. Leonard S. Lyon: You had a trade name.

Mr. Harris: Kleenflo.

Mr. Leonard S. Lyon: Kleenflo device?

The Witness: I didn't get your question. [579]

By Mr. Leonard S. Lyon:

Q. Can you tell us what the net sales and receipts have been for your company from the manufacture of air filters like Exhibit S? Exhibit S is the one that you said was competitive with Air-Maze P-5.

A. Yes, I know Exhibit S. We manufacture three different types of filters, in various sizes.

No, I would hesitate, frankly, to even estimate

(Testimony of Kenneth F. Russell.)

what the volume is. As I say, it is a small percentage of the total volume of business of Vortex. To explain that further, if I may, sir, the sale of Vortex panel filters has been confined to the local area. We have one distributor in Los Angeles and, due to shortage of materials in the past, we have hesitated in going any further than that. However, recently we have established a distributor in Texas, where we expect to do some business.

Q. Will you turn now to Exhibit 1 in the prior-patent book?

The Court: Are you offering the book of prior art in evidence?

Mr. Harris: Yes, I will offer it now. Defendants' Exhibit B is offered into evidence.

The Court: It is admitted.

(The book of patents referred to, marked Defendants' Exhibit B, was received in evidence.) [580]

By Mr. Leonard S. Lyon:

Q. Now, with respect to item 1 in that book, the St. Cyr patent, have you ever seen a wire mesh, a wire gauze strainer used in a carburetor or between a carburetor and an engine?

A. No, I don't believe I have seen a wire mesh unit or wire gauze. Pardon me. I did not intentionally do that. Wire——

Q. You don't know about the use of that material as strainers in carburetors, have no knowledge of it?

(Testimony of Kenneth F. Russell.)

A. You did not say a strainer in a carburetor. You said a device between the carburetor and the engine, sir, or did I misunderstand you?

Q. Or in a carburetor.

A. In a carburetor?

Q. Yes.

A. Why would it be in a carburetor? It depends——

The Court: Did you ever see it any place in a carburetor or in a carburetion system?

The Witness: Strictly speaking, I have seen filter devices that filter the gasoline that flows into the carburetor bowl, and those filtering devices consist of what we call strainer cloth and what is illustrated in various catalogs as strainer cloth.

By Mr. Leonard S. Lyon: [581]

Q. What mesh is that?

A. Strainer cloth in a catalog is listed and starts in at probably 30, 40 mesh, and it might go down to 60, 70 mesh per inch.

The Court: It is a very fine mesh?

The Witness: Quite fine, sir.

By Mr. Leonard S. Lyon:

Q. Now, have you ever seen any wire cloth or any wire mesh used as a vaporizer element?

A. No, sir, I have not.

Q. In a carburetor?

A. No, sir, I have not.

Q. Referring to the Farr patent, item No. 10 in the book of patents, have you ever seen any of the devices manufactured by the Farr Company under that patent?

(Testimony of Kenneth F. Russell.)

Mr. Harris: You mean like shown in that patent?

Mr. Leonard S. Lyon: Yes.

A. I don't recall of seeing a device as manufactured in accordance with these patent drawings.

Q. In your opinion, how fast would the device shown in Fig. 3 of that patent be rotated in operation?

A. In my opinion, the device should be rotated relatively slow.

Q. How fast?

A. It would depend upon the diameter of the unit, how [582] large the unit is. If you had a relatively small unit—

Q. How large are they, do you know?

A. I understand they run from a foot or so in diameter and go up to several feet.

Q. Now, tell us, beginning at one diameter and leading through the others, what in your opinion their speeds of rotation are.

A. Maybe I can simplify it. In my opinion, I would supply the unit with approximately one to two feet a minute for a peripheral speed.

Q. How many revolutions per minute or how much of a revolution per minute?

A. Well, if the device were one foot in diameter, then, that would be three and a seventh feet around, so therefore it would take a little over three minutes to make a revolution on that device.

Q. Is that your understanding of the way this device operates, as shown in this patent?

A. No. That is my opinion of how it would.

(Testimony of Kenneth F. Russell.)

Q. Can you tell us how it operates, from the patent?

A. Yes, it states in the patent that it is a rotating device, it rotates on a shaft.

Q. Does it state how fast it rotates?

A. No, it doesn't state how fast.

Q. Can you see through the filter member of this [583] patent?

Mr. Harris: Well, he says he never saw one.

A. I never saw one.

By Mr. Leonard S. Lyon:

Q. Do you think you could see through it?

A. The patent doesn't state at what angle the corrugations are made, so it would depend on that, and it doesn't say how thick the filter is.

Q. Well, based on your opinion as an expert in this art, would you expect to be able to see through it?

A. Since it says somewhere in the patent something to the effect that with the device they want to prevent water from being carried on in the air stream, it would be my opinion that it would be advantageous to make it so you could not see through the unit.

Q. I show you a photograph of a filter member and ask you if you can see through that?

Mr. Harris: May I see that, counsel?

Mr. Leonard S. Lyon: Excuse me.

The Court: See through the photograph?

By Mr. Leonard S. Lyon:

Q. (Continuing) See through the filter member?

The Court: What will be the next number?

(Testimony of Kenneth F. Russell.)

The Clerk: No. 26.

The Court: 26? [584]

The Clerk: Yes, sir.

(The photograph referred to was marked Plaintiff's Exhibit No. 26 for identification.)

\* \* \* \* \*

The Witness: Well, on the photograph, Exhibit 26, it appears to be that you can see through the passages as shown in one section of it.

By Mr. Leonard S. Lyon:

Q. Can you tell whether or not that filter member, as it appears in that photograph, is constructed in accordance with the teachings of the Farr patent that I have just identified? [585]

\* \* \* \* \*

The Witness: It appears that this is a section of the filter element constructed in accordance with the '480 patent.

By Mr. Leonard S. Lyon:

Q. Now, when you refer to Fig. 1 of this Farr patent, do you understand that the filter member shown in that patent rotates and that its lower side is immersed in a reservoir of water? [586]

A. That was my understanding.

Q. Can you tell us what the dust-load capacity of such a filter would be?

A. No. I would hesitate to state.

Q. Why?

A. Because I have already testified, I haven't seen one of these units. Besides, you haven't specified as to the size of the unit, the thickness of it, or all the other dimensions.

(Testimony of Kenneth F. Russell.)

Q. Would a device such as illustrated in Fig. 1 of the Farr patent in question have a dust-loading capacity, in view of the fact that the under side of the device rotates through a bath of water?

A. Yes, it could have a dust-loading capacity, if you include in the category of dust various lints and so on that might not be easily washed off, but by merely dipping a piece of fabric or screen, or whatever this is made of, into a tank of liquid and bringing it out, this is not a violent action apparently.

Q. Would that be the type of dust-loading capacity that is referred to in connection with an air filter panel like Exhibit 2 and Exhibit 6?

A. What? I did not get the question.

Q. This supposed capacity that you say might be had by the Farr device, of Fig. 1 of the patent No. 2,286,480. [587]

A. Well, so far as capacity, I am not too sure of just exactly what is meant. If you mean would the dust accumulate—my answer was that lint possibly could accumulate on this unit and not be washed off, and if it wasn't washed off, it would accumulate.

Q. Would you expect it to be cleaned from time to time, the unit shown in Fig. 1 of Patent No. 2,286,480?

A. As I have testified, I haven't seen one of these units, but based upon my knowledge of similar units, I believe that at periods you would have to remove some lint from this unit.

\* \* \* \* \*

FRANK B. ROWLEY

called as a witness on behalf of the defendants, being first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Frank B. Rowley.

The Clerk: And your address?

The Witness: Excelsior, Minnesota. [588]

Direct Examination

By Mr. Baldwin:

Q. Will you state your age and present position or occupation?

A. I am 69 years old and Professor Emeritus, Mechanical Engineering, University of Minnesota, and consulting engineer.

Q. Will you state what your education has been?

A. I am a graduate——

The Court: What was your position, did you say?

The Witness: Consulting engineer and Professor Emeritus of Mechanical Engineering, University of Minnesota.

The Court: Now your experience, he asked you.

Mr. Baldwin: Education.

The Witness: My education was Bachelor of Science, mechanical engineering, University of Wisconsin, 1905.

I have a professional degree of mechanical engineering in 1906 from Wisconsin.



(Testimony of Frank B. Rowley.)

By Mr. Baldwin:

Q. Will you state your occupational and professional experience for the past 40 years?

A. I have been with the University of Minnesota for over 40 years on the engineering faculty through the various positions of instructor, up to Professor of Mechanical Engineering, and when I retired in 1950 I was head of the [589] engineering department and director of the engineering experiment station.

During my work at the university I also carried on consulting engineering work for over 40 years in various fields of mechanical engineering, a large amount of it in air conditioning, air filters, and so on.

I also conducted research in those fields throughout the period I was there; published a good many papers, at least over a hundred, in the various fields of mechanical engineering.

Q. Do you belong to any professional societies?

A. Yes. I am a member of several. I am a life member of the American Society of Heating and Ventilating Engineers, a life member of the American Society of Mechanical Engineers, a life member of the Minneapolis Engineers Club.

I am a member of the American Society of Refrigerating Engineers. I am a member of the Minnesota Association of Professional Engineers, the National Association of Professional Engineers, a member of the American Society for Engineering Education, and a fellow in the American Associa-

(Testimony of Frank B. Rowley.)

tion for the Advancement of Science, a registered professional engineer in Minnesota.

Q. Have you held any offices in any of these societies?

A. Yes. I have held several offices, including the [590] president of the National Society of the American Society of Heating and Ventilating Engineers.

Q. How long ago was that?

A. 1932, I believe.

Q. Are you listed in any bibliographies?

A. Yes.

Q. Could you name them?

A. Who's Who in America and Who's Who in Engineering, and American Men of Science.

Q. Could you state briefly your experience in the testing and evaluating of air filters?

A. I have been working with the testing of air filters and dust, in that field, as part of my work, for the past 25 years. I was working on the development of the code for testing which was adopted by the American Society of Heating and Ventilating Engineers when that was adopted, a member of the committee.

Q. What year was that?

A. 1933, I believe.

And I have done research work, a large amount of research, to determine some of the fundamental properties of air filters and dust in the air.

I have also done a considerable amount of consulting work for various companies, including

(Testimony of Frank B. Rowley.)

development of air filters, testing of air filters, and so forth. [591]

The Court: Have you ever studied smog?

The Witness: I am getting that here.

By Mr. Baldwin:

Q. What is your connection with this action of Farr Company v. Gratiot and Air-Maze Corporation?

A. I was retained by the Air-Maze Company for testing filters.

Q. Have you ever been employed previously by Air-Maze Corporation in any capacity?

A. No.

Q. Is there any method of testing filter panels of the Farr type and the Air-Maze P-5 type which has been generally accepted throughout the air filter industry?

A. The weight method has been more generally accepted than any other. That is the comparison of the weight of the dust taken out to the dust fed.

There are other methods that have been proposed but there is no one method I think that has been generally accepted by all filter manufacturers in all details.

Q. What in your opinion is the most generally accepted?

A. I think the weight method that is adopted by the American Society of Heating and Ventilating Engineers.

Q. Is that embodied in a code or any such thing?

(Testimony of Frank B. Rowley.)

A. That is a code method. Most companies have modified [592] it a little in the way they use it.

Q. If I said to you without further explanation that a certain filter panel tested 90 per cent efficiency or 98 per cent efficiency, would that statement alone mean anything to you?

A. No, I would have to know how it was tested and on what basis the efficiency was reported, what kind of dust was used, and some of the factors involved in the test procedure.

Q. What are some of the things that you would have to know?

A. I would want to know what kind of dust was used, what dust mixture was used, how that dust was fed into the apparatus. I would want to know what the efficiency was based on, whether it was based upon the weight method, how those weights were taken, and so forth. Also the air velocity through the filter.

Q. Can changes in those various conditions make a change of the order of a slight change or a great change in the result which you would obtain?

A. It might make a great change. By changing, for instance, the type of dust, it would make a very big change in the performance factor of the filter.

Q. Would you explain a word which has been in question here, namely, "arrestance"? [593]

A. The arrestance is a common term used with air filter people to give the efficiency of the filter in terms of the dust taken out of the air. They used

(Testimony of Frank B. Rowley.)

that in the code originally in 1933 to differentiate from such efficiencies as resistance, and so forth. There are several factors and the arrestance is the one that applies to the dust taken out of the air.

The Court: The arrest of what? Arrest of dust?

The Witness: The arrest of dust.

The Court: It stops the dust?

The Witness: That is right.

The Court: Well, then, that has to be explained in terms of pounds or ounces or grams per cubic foot.

The Witness: Of air, that is right. They usually take it in whatever weight units that they are working on. If they are working in grams they say arrestance in grams.

The Court: Grams of what?

The Witness: It is a percentage.

The Court: Of cubic foot or a thousand cubic foot?

The Witness: It is grams or it is percentage of the amount of dust which is taken out.

For instance, if you fed 100 grams into the filter and there remained 70 grams in the filter, that would be an arrestance of 70 per cent, the percentage of air which is retained in the filter. [594]

The Court: The percentage of dust, you mean?

The Witness: Of dust. Pardon me.

Mr. Baldwin: Will you mark this?

(The document referred to was marked Defendants' Exhibit EE for identification.)

The Court: Regardless of the number of cubic feet of air?

(Testimony of Frank B. Rowley.)

The Witness: That is right.

The Court: Does not the rate of air flow through the filter have something to do with the efficiency or the value or effectiveness of it?

The Witness: Yes, that does, Your Honor.

The Court: In other words, it can flow 5,000 cubic feet of air through the filter in a minute and add 100 grams of dirt and you took out 70 per cent, that would be a different effectiveness than if you only flow 2,000 cubic feet through at the same time?

The Witness: That is correct, but still it would be an arrestance under those conditions that would be reported.

The Court: Well, then, when you give the arrestance you give the percentage and rate of flow of air?

The Witness: That should be incorporated with the whole test, all of the items.

The Court: In other words, the arrestance is 70 per cent at 2,000 cubic feet of air per minute? [595]

The Witness: That is right.

By Mr. Baldwin:

Q. I hand you a paper marked for identification Defendants' Exhibit EE and ask you to explain what it is, if you can.

A. This is a photograph of the test apparatus which we have at the University of Minnesota, showing the test set-up for testing and rating filters by the weight method.

This is set up in accordance with the code which

(Testimony of Frank B. Rowley.)

we spoke of—do you want me to explain it in detail?

Q. Would you explain just the chief parts of the apparatus in that photograph?

A. The chief parts of the apparatus are, first, a testing duct, a filter duct, which is shown in the center. That is a 20-inch square duct, which has been used fairly universally because there are so many 20-inch square filters made. It is a practical size to work with. And that duct holds the test filter in the center. It is sealed in the center of the duct.

At the left-hand side of the photograph is a duct feeding apparatus which has been designed to feed the dust into the air stream entering the filter. That is a method of mixing the dust with the air.

I might say that on the right just beyond the photograph and not shown there is a fan which draws the air from [596] the left to the right through the filter to be tested.

The Court: Is the filter here at the immediate entrance of this big tunnel or duct?

The Witness: No, it is right back of that board in the middle.

The Court: In back of the rack?

The Witness: In back of the rack. It is a little beyond the center.

The Court: Is this end open down here where the dust is?

The Witness: That is right. The air is drawn through the apparatus with a fan on the right and

(Testimony of Frank B. Rowley.)

the air then comes in at the left. There is an orifice that is cut about 12 inches in diameter there.

The Court: Is it open? It looks like it has a screen there.

The Witness: No, it is open, with the exception that the end plate—that end plate is a board—with a hole cut in there, that is open, and the air goes through that, and the dust then is fed into the center and mixed thoroughly with the air when it is pulled into the apparatus. And that air is pulled through the filter which is near the central section, and those gauges on the board are for the purpose of measuring the air pressure drop across the filter during the test. You have to know how much pressure drop is [597] required to pull the air through the filter.

Then on beyond the square duct where it comes into the round at the right, there is an orifice in there for measuring the volume of air which goes through the test apparatus. That is a standard rounded orifice and one of the gauges measures the pressure in order to get the volume of air flowing through the filter.

Then over at the extreme right of the photograph is a vacuum pump that is used for pulling the sample out of the air after it leaves the filter in order to find out how much dirt is left in the air after it passes through the filter.

I think those are the essentials of it.

By Mr. Baldwin:

Q. And how do you know how much dirt is fed into the filter?



(Testimony of Frank B. Rowley.)

A. That is determined by weighing the dirt on a disc. This dust feeding apparatus has a disc like a phonograph record disc and the dirt is weighed on that, the disc is weighed before the test and after the test, and the difference is the amount drawn in.

Mr. Baldwin: Will you mark this, please?

The Clerk: FF.

The document referred to was marked Defendants' Exhibit FF for identification.)

The Court: That is sucked off the phonograph record? [598]

The Witness: That is right. It is sucked off at a uniform rate. It is designed so that it gives a constant uniform rate throughout the test.

By Mr. Harris:

Q. I hand you a paper marked Defendants' Exhibit FF and ask you to identify it, if you can.

A. This is an enlarged or closeup view of the dust feeding apparatus that I just described.

Q. Is the dust on that round disc?

A. The dust is on the round disc at the left lower corner of the photograph and it is spread over that at a uniform thickness in area for the right amount of it and the disc rotates and a little ribbon is shaved off right under the pickup which is at the right side of the disc, and there it is picked up by suction and pulled into the test apparatus.

Q. Would you state how long you have used this apparatus?

(Testimony of Frank B. Rowley.)

A. Well, over 15 years, this particular one which we developed at Minnesota, probably 18 years.

Mr. Baldwin: Will you mark this?

The Clerk: GG.

(The document referred to was marked Defendants' Exhibit GG for identification.)

The Court: You have various kinds of dust that you test?

The Witness: There are different types of dust used and [599] the code specified 50 per cent carbon black and 50 per cent Pocahontas ash. Most manufacturers have reduced that now to 20 per cent carbon black and 80 per cent Pocahontas ash.

The Court: Do you ever test it by taking actual dust samples from the air?

The Witness: Not by the weight method. That has been a difficult problem to get enough dust out of the air for this type of a test so that you can get enough weight to form a test and keep it in the dust form.

That is one reason for getting the carbon and Pocahontas ash in the samples. A great deal of work was done at the beginning when this code was established and also since trying to get a dust, a mixture, which would simulate the dust that we have in the ordinary air, and it was felt that we had to have carbon in it but felt that 20 per cent probably represented more adequately the amount than 50 per cent.

(Testimony of Frank B. Rowley.)

By Mr. Baldwin:

Q. I hand you a paper marked for identification Defendants' Exhibit GG and ask you to explain, if you can, what it represents.

A. This represents the smaller test duct which was set up for the purpose of testing six-inch square filters or seven-inch outside square filters by the same test method as used on the one I have just described.

Now this was set up in such a way that the same fan [600] which was used on the big duct could be used to pull the air through the small test duct and the same dust feeding apparatus could be used and the filter was clamped in the six-inch square duct, and in this case the dust in the downstream air was taken out by what is known as an absolute filter. That is, it was filtered through a fine fiberglass material—I think they call it—I have forgotten the name, but anyhow it is a fine filter, and it takes the dust all out of the air, and that was used for sampling the downstream side of the air.

Q. Would you say that the fiberglass filter you just mentioned was similar to a wad of cotton as to fluffiness?

A. Yes. It is more dense. It is a very fine fiber, packed, and it is packed so closely that it filters out, as far as we can tell, a hundred per cent of the dust. And it is a filter that is used by several test laboratories for sampling the air as one method of getting a sample of the dust in the downstream side of the filter.

(Testimony of Frank B. Rowley.)

Q. I believe you have stated the dust you used was in the tests which you made for Air-Maze Corporation, was what you call 80-20, or 80 per cent Pocahontas fly ash and 20 per cent carbon black, is that correct?

A. It was 80 per cent Pocahontas ash, not fly ash but Pocahontas ash, screened through a 200 mesh screen and 20 per cent carbon black, and the particular brand was K-1 manufactured [601] by L. Martin Company, and that was screened through a 100 mesh.

The two of them were mixed and the mixture was again put through a 100 mesh screen for better mixing of the dust.

Q. About what was the density of this dust?

A. It was about .55 grams per cubic centimeter. That is the jolted density.

The Court: The what?

The Witness: The jolted density. We put dust in a container and it is fluffy, and we jolt it down.

The Court: Pack it down?

The Witness: Pack it down. We do it by jolting it.

By Mr. Baldwin:

Q. Have you been in the testing laboratories of any filter manufacturers who manufacture filter panels like the Far-Air filter and the Air-Maze P-5 filter? A. Yes.

Q. Which laboratories have you been in?

A. Well, I have been in Air-Maze laboratory, of course. I have been in the Burgess laboratory.

(Testimony of Frank P. Rowley.)

That is the Research Products Laboratory now. I have been in the Owens-Corning Laboratory and the Bureau of Standards laboratory. [602]

By Mr. Baldwin:

Q. Any in Kentucky?

A. No, I don't think so. No, I haven't been in anything in Kentucky.

The Court: "In anything"?

The Witness: Any air filters.

Mr. Leonard S. Lyon: If Your Honor please, the witness has not included the Farr Company, and if he would like to see the Farr Company equipment, so that he could be informed as to that, in connection with his testimony, Mr. Duncan would be very glad to take him down there during the noon recess and show it to him, if that would help him any. [603]

\* \* \* \* \*

Mr. Leonard S. Lyon: I don't propose to go. I just suggest that Mr. Duncan take him out and answer any questions the witness wants to know about the equipment.

By Mr. Baldwin:

Q. Will you state what dusts were used in these laboratories you visited?

The Court: Or have you already seen the Farr patented device?

The Witness: No. I think I heard something about it but I never saw it.

The Court: Do you want to go and see it?

The Witness: If it doesn't interfere with things, I would like to, sometime. I might say I am not

(Testimony of Frank P. Rowley.)

aiming at criticizing their equipment. I am presenting these things, I am just telling you what I have seen. [605]

The Court: You had asked him whether or not he had ever been in Kentucky, is that correct?

The Witness: I think that referred to the American filter. I have never been in their laboratory. I have talked to their men, but I have not been in their laboratory.

The Court: Have you ever been in their laboratory?

The Witness: No.

The Court: I suppose in Kentucky there are a great many installations in the tobacco plants.

The Witness: I presume so.

The Court: And in horse barns, maybe?

The Witness: I know they have the horses.

By Mr. Baldwin:

Q. The question was, what test dusts were used in these laboratories which you have visited?

A. Well, they have varied somewhat. The predominant test dust has been a mixture of 80 per cent Pocahontas ash and 20 per cent——

The Court: Well, what is the difference between this Pocahontas ash and Pocahontas fly ash?

The Witness: The difference is in the way it is prepared. Pocahontas ash is left over after a slow burning of the coal, and the fly ash, as generally understood, is the ash, small particles that are picked up at the back of a furnace, at a power furnace, from the fire, ash that pulls up [606] the stack and goes outside.

(Testimony of Frank P. Rowley.)

The Court: In other words, it is a lighter weight ash?

The Witness: No, it is not really a light weight. It is more of a granular ash, but it flies up due to the draft in the stack.

The Court: That is where the term "fly ash" comes from?

The Witness: That is where the term comes from.

By Mr. Baldwin:

Q. Which of these companies, whose laboratories you visited, use the 80-20 dust you have mentioned?

A. Well, the Madison laboratory, which is Research Products now, and it used to be the Burgess; the Owens-Corning use it, and we use it, of course.

The Court: You use it?

The Witness: We use the 80-20.

By Mr. Baldwin:

Q. What does Air-Maze use, if you know?

A. They use 80-20. The Bureau of Standards uses fly ash and lint. They use the lint in the dust, in place of the carbon, that is, their mixture is a little different.

The Court: The carbon is coal dust?

The Witness: It is stuff that floats around in the air. No, it isn't the coal dust. It is the stuff that corresponds to the soot. It comes out of the stack. [607]

\* \* \* \* \*

Q. Professor Rowley, the last question I asked you had to do with the composition of the National

(Testimony of Frank P. Rowley.)

Bureau of Standards dust. Would you please state that again, if you will?

A. I think I said fly ash. It is actually Cottrell ash that they use.

The Court: You said Pocahontas ash.

The Witness: Not the Bureau of Standards. They use Cottrell ash.

By Mr. Baldwin:

Q. What percentage? A. 96 per cent.

Q. What is the rest? A. Lint.

The Court: What is the difference between Cottrell ash and Pocahontas ash? [609]

The Witness: The Cottrell is a little heavier and it is a fly ash, whereas Pocahontas is a burnt ash.

The Court: Cottrell ash is entirely a fly ash?

The Witness: It is precipitated out. It is probably a little finer than the average fly ash. It is precipitated out.

The Court: And the ordinary term of fly ash is soot?

The Witness: Well, I would say that soot is in it but I think fly ash is a little heavier than soot. It is the fine ash that goes up the chimney but more of a dust, more of a granular dust.

The Court: Very well.

By Mr. Baldwin:

Q. It has been stated in this action that the Farr Company tests its filter panels with a special kind of Arizona road dust. Do you know of any filter manufacturer known to you who is now testing filter panels with Arizona road dust?

A. No, not of this type of panel that we are talking about.



(Testimony of Frank P. Rowley.)

Mr. Leonard S. Lyon: I can't hear the witness.

The Witness: No.

By Mr. Baldwin:

Q. I show you Plaintiff's Exhibit 12, which is labeled Air-Maze filter P-5, and ask you if you tested a panel of [610] that type.

A. Yes, I did.

Q. As near as you know, it was exactly like this? A. Yes, it was.

The Court: That is the P-5?

Mr. Baldwin: P-5; yes, Your Honor.

The Court: The alleged infringing device, is that correct?

Mr. Baldwin: That is correct.

Will you mark this, please?

The Clerk: HH.

(The document referred to was marked Defendants' Exhibit HH for identification.)

By Mr. Baldwin:

Q. I hand you a chart marked for identification Defendants' Exhibit HH and ask if you can identify it. A. Yes.

Q. Will you state what it is?

A. It is a graphical presentation of the results of my test on the P-5 Air-Maze filter just identified. I don't know the number.

The Court: Exhibit 12.

The Witness: Exhibit 12.

By Mr. Harris:

Q. What does the upper curve on this chart represent? [611]

(Testimony of Frank P. Rowley.)

A. The upper curve represents the arrestance or, in other words, the efficiency in terms of the percentage of dust retained on the filter throughout the test.

Q. Will you read a few values so as to illustrate the trend of that curve?

A. The trend of the curve, it starts out at the left about 77.6 per cent efficiency, and it goes to the right to about 18 hours—that is on the horizontal scale—at substantially the same efficiency, where it begins to drop.

The Court: Eighteen hours?

The Witness: That, Your Honor, is on the bottom scale.

The Court: Time in hours?

The Witness: Time in hours. There are three items on that bottom scale that I might explain.

The Court: I see. Those are the hours, and the one below is the dust load on the filter?

The Witness: That is correct.

The Court: Up to 18 hours?

The Witness: And then from there on it begins to drop, and at 22 hours the efficiency is around 76 and two or three tenths per cent.

The Court: What are those dots on there?

The Witness: Those are dots of the actual values of my test per each hour. The tests are run in hourly intervals. Each hour we take a check to get the calculated efficiency [612] from the dust caught by the filter and the dust fed in and those are actually the test points.

(Testimony of Frank P. Rowley.)

Now those test points very seldom fall on a good curve. They are points and are subject to the conditions of the test, variations, so we plot those on the graph and then we draw the curve through, which is our interpretation of the test results, a smooth curve.

The Court: How would you account, for instance, for this at 16 hours the dust arrestance or efficiency jumping from 77 up to 80?

The Witness: I believe that is at the time the test was stopped overnight.

Now we run these tests, Your Honor, part one day and part the next, and usually when we stop a test at night and start it the next morning the efficiency is a little higher the next morning due to the fact that the dust has had a time to soak through the oil and it collects a little better for a few hours.

Mr. Leonard S. Lyon: The witness says he believes that he can tell us whether or not that is so. I would like to know.

The Witness: Yes, I have tested many of them.  
\* \* \* \* \* [613]

The Witness: I should, I think, explain the other figures on this horizontal line.

The Court: Yes.

The Witness: On the central line there, of course, are the hours of the test, and the figures on the top of that line give the weight of dust fed in grams into the filter, which accumulated for the period, so any figure along there represents the

(Testimony of Frank P. Rowley.)

total dust in grams that was fed to the filter at that time.

And the lower line represents the total dust that was retained by the filter at that period.

The Court: And that is how you get your percentage curve?

The Witness: That is correct.

The Court: At the top, is that correct?

The Witness: That is correct.

The Court: And the lower curve here on the graph is the filter resistance?

The Witness: In inches of water throughout the test.

The Court: In the test described by the first witness here.

By Mr. Baldwin:

Q. Will you explain where that resistance curve starts and stops?

A. The resistance curve in this case starts at .05 inches of water and it ends at .17 inches of water at the [615] end of the test, which was 22 hours.

The Court: That is called your pressure drop also?

The Witness: Yes, that is right.

By Mr. Baldwin:

Q. I notice, in line with the explanation you gave to the Court this morning, that you have neglected to mark on this curve the air velocity. Will you state what that was?

A. The air velocity is 300 feet per minute, face velocity of the filter.

(Testimony of Frank P. Rowley.)

The Court: 300 feet per minute?

The Witness: 300 feet per minute. That is correct.

The Court: Did you ever test it at 519 feet per minute?

The Witness: Not this filter, no.

The Court: Not that filter.

By Mr. Baldwin:

Q. I hand you Defendants' Exhibit A and ask you if you have tested a filter having the filter media like that. A. Yes.

Q. What size was the filter you tested?

A. A 20-inch-square filter.

Mr. Baldwin: This is the P-5 obsolete, Your Honor.

The Court: All right.

The Witness: I might say, when I say "a 20-inch square," these filters are just a little less than that. I tested a commercial size, 20-inch size. [616]

The Court: Why did you introduce the air at 300 feet per minute?

The Witness: Well, that is the air velocity that is normally used in testing, and there was no particular reason that I knew of for testing it at 519.

The Court: Well, is the velocity of air that is ordinarily fed into an air-conditioning unit or through a filter—

The Witness: Yes.

The Court: —at 300 feet per unit or at 519?

The Witness: Well, ranging between there, 300 and up to 500.

The Court: Up to 500?

(Testimony of Frank P. Rowley.)

The Witness: Yes. There isn't any specific velocity, to say that is the velocity that is used on all of them.

The Court: I suppose on some installations there is a great deal faster rate?

The Witness: Yes, there are some faster.

The Court: On motors?

The Witness: On motors: When it comes to carburetors and Diesel engines, that is very much higher. That is a different type of filter usually used, too.

Mr. Baldwin: Will you mark this, please?

(The document referred to was marked Defendants' Exhibit II for identification.)

By Mr. Baldwin: [617]

Q. I hand you a paper marked for identification Defendants' Exhibit II and ask you if you can identify it.

A. Yes, That is the curve representing the test results which I obtained on the 20-inch-square Air-Maze P-5 obsolete type of filter, Exhibit A. The test was made by the same methods, the same air velocity, the same conditions, as the one just described.

Q. The one just described is— A. P-5.

Q. —P-5, and is Exhibit HH?

A. Exhibit HH.

Q. Would you state a few representative facts that you obtained from this Exhibit II, as to arrestance?

(Testimony of Frank P. Rowley.)

A. As to the arrestance, the arrestance started a little higher than average. It started up at a little above 84 per cent and it dropped down until it struck about 80 per cent, at 10 hours' period, and at 13 hours of testing it started to drop and dropped down until, at 19 hours, it had dropped down to 60 per cent arrestance.

Q. And would you read some representative values from the resistance curve?

A. The resistance curve starts at .05 inches of water and it ends up at .08, a little over .08 inches of water at the end of 19 hours.

Mr. Baldwin: Have you Exhibit 2, Mr. Clerk?

The Court: In other words, what this means is that at the end there of 13 hours, the capacity of the filter to retain the dust passing through it was reduced in percentage?

The Witness: That is correct.

The Court: Very rapidly?

The Witness: Dropping down, that is right.

By Mr. Baldwin:

Q. Do the results plotted on Defendants' Exhibit II indicate to you a good or a poor filter?

A. It indicates it is a good filter.

Q. Up to what dust load?

A. Up to the dust load of about five hundred and—well, the dust load on the filter would be about 425 to '50 grams.

This starts out at a very good efficiency and runs good efficiency until it gets out to about 13 or 14 hours.

(Testimony of Frank P. Rowley.)

Q. I show you Plaintiff's Exhibit No. 2 and ask you if you tested a filter like that.                      A. Yes.

The Court: Plaintiff's Exhibit 2 is what?

Mr. Baldwin: Exhibit 2 is the Farr panel——

The Court: In suit.

Mr. Baldwin: ——in suit, the '479 patent.

The Witness: Yes.

The Court: The air was fed at 300 feet per minute? [619]

The Witness: Yes, that is correct.

The Court: On all these tests that were conducted?

The Witness: All these tests, at the same air speed, the same conditions.

The Court: The same air speed, the same dust?

The Witness: And the same conditions.

The Court: And the same quantity?

The Witness: The same rate.

The Court: The same rate?

The Witness: That is right.

By Mr. Baldwin:

Q. I hand you another paper marked for identification Defendants' Exhibit JJ, and ask you if you can identify it.                      A. Yes.

(The document referred to was marked Defendants' Exhibit JJ for identification.)

Q. What does that represent?

A. That represents the test data which I took in testing the Farr filter in suit. I have forgotten that exhibit number.

The Court: Exhibit 2.



(Testimony of Frank P. Rowley.)

The Witness: Farr filter, Exhibit 2. And this was tested with the same dust, the same dust feed, and all conditions the same as the other two I have just described.

Mr. Baldwin: What was that last answer? [620]

(Record read by the reporter.)

By Mr. Baldwin:

Q. Now, will you explain the values, just roughly, from this curve, Exhibit JJ?

A. Well, taking the arrestance values, you will note at the top left-hand corner there is a very high value there, the filter starts, and at the end of the first hour gave a very high arrestance value. Then it dropped down to just about 80, a little above 80, and from there on its gradually dropped until at the end of 14 hours it was to 76, and at the end of 21 hours the arrestance was  $75\frac{1}{2}$ , about. Now, that drop—I mean that high value at the start, I checked on a couple of other tests and they seemed to be characteristic, they seemed to get that high test with the immediate drop after the first hour.

The Court: Oh, it started way up here at 94?

The Witness: Way up there very high, when I first started it.

By Mr. Baldwin:

Q. On how many tests did you find that same characteristic?

A. I found it on two other tests, I checked it twice besides this and found the same general characteristic.

(Testimony of Frank P. Rowley.)

Q. A total of three tests?                      A. Yes. [621]

Q. Have you any theory as to why that happens?

A. Well, I think it happened perhaps because I may have had excess oil in that it hadn't been drained off between those contact points. There are a lot of contact lines where the flat screens contact the ridges of the corrugated ridges and they naturally retain the oil for some time after it is soaked and perhaps that was not drained off or blown off thoroughly before the test started. And that would give a high value to the first hour until that disappeared.

Q. Will you read a few characteristic values from the resistance curve?

A. The resistance curve starts at .05 inches and gradually rises so that at the end of 21 hours the resistance is .14.

Q. You have stated that you tested a 20x20 Air-Maze P-5 filter?                      A. Yes.

Q. What size was that?

A. I tested a 7-inch P-5, that is, 7 inches outside, 7 inches square.

Q. Will you explain 7 inches outside and what you mean by that?

A. I mean that was the dimensions of the filter frame.

The Court: Commonly referred to here as a 7-inch filter. It has area exposed that is reduced by the width of [622] the frame, whatever it is.

The Witness: That is right.

(Testimony of Frank P. Rowley.)

The Court: And that is called a 7-inch frame.

The Witness: That is a 7-inch frame, and my test values, run the area exposed, is a 6-inch filter.

Mr. Baldwin: I just wanted to bring out that it is a 6x6 area exposed.

The Court: Is this a 20x20 exposed?

The Witness: Your Honor, there is a difference when we test a large filter 20x20, so that this little area around the edge doesn't make much difference, but when we test a 7-inch filter it makes quite a difference, so to take care of that in this small filter we fill that area between there with a round half an inch of paraffine so we have actually a six-inch filter.

Mr. Baldwin: Will you mark this, please?

The Clerk: KK.

(The document referred to was marked Defendants' Exhibit KK for identification.)

The Court: That is the Air-Maze? There is one in evidence, is there, a 7x7?

Mr. Harris: No, I don't think so, your Honor.  
By Mr. Baldwin:

Q. I will ask him: Was the filter media of this 7x7 panel exactly like the filter media of the 20x20 filter? [623]

A. Yes.

The Court: The P-5?

The Witness: The P-5.

(Testimony of Frank P. Rowley.)

By Mr. Baldwin:

Q. I hand you a paper marked for identification Defendants' Exhibit KK and ask if you can identify it?

A. Yes. The paper KK represents the curve or test values which I obtained from the 7-inch square filter on the test which I ran on the 6-inch square duct. These values are in arrestance and resistance just as the others were.

The Court: Is this the same rate?

The Witness: This is the same rate of dust fed.

The Court: And 20 grams?

The Witness: And 20 grams per hour reduced, because, you see, it is on the same ratio because this filter is smaller.

The Court: The ratio of 6x6 to 20x20?

The Witness: Yes, that is right.

By Mr. Baldwin:

Q. Will you explain two points upon the curve toward the left-hand side of the arrestance curve which seem to be way out of line?

A. Well, this was calibration. The primary purpose of running this test was to check the calibration of the 6-inch [624] duct which we had just built for these small filters, and in determining the efficiency we took the dust in the air on the downstream with an absolute filter, that is, I filtered all of it, and for the first two tests it was running high due to the fact that I wasn't catching all of the dust in that filter.

We got that corrected and it began to run uni-

(Testimony of Frank P. Rowley.)

formly, and since it was merely a check to check the apparatus, I considered when we had run those six or eight hours uniform that that was sufficient so that those areas were taken care of.

Q. I hand you Defendants' Exhibit GG and ask you to point out where this absolute filter media was in this test set-up.

A. The absolute filter media in this test set-up is at the expanded area just below the gauge board on Exhibit GG.

Q. What did you testify that filter media was at that point?

A. It was Corning fiberglass, very fine. It has a special trade name but I cannot think of it now. But it is a fine fiberglass. It is almost a perfect filter. It takes out a hundred per cent of the dust.

Q. And had you made a preliminary check to see whether it would catch a hundred per cent of the dust?

A. Yes. I made that check by taking the filter out [625] and feeding a given amount of dust into the duct and taking then the amount of that dust collected on this absolute filter media and that checked.

Q. In other words, you checked that amount on the absolute filter with the amount that came off of that feeding disc, is that correct?

A. Yes, that is correct.

Q. And how did this other filter media get in this for two hours?

A. Well, that was in this case—it was the be-

(Testimony of Frank P. Rowley.)

ginning of the test and that filter media was the same, but it wasn't clamped in tight enough to catch all of the dust, and you see, with a continuous test, we wouldn't know that until after we had run the first test and calculated it and by that time we were well into the second test so we couldn't correct it until after the second hour. [626]

Q. As a result of this arrestance curve on this 7x7 air panel, the Air-Maze P-5 filter, how does it check with the data on Exhibit HH?

A. Well, it gives a little lower resistance. It checks rather well though.

Let me see Exhibit HH.

(The document referred to was passed to the witness.)

The Witness: Yes, that is right, it gives a little lower arrestance value. That may be due to the filter or something but at any rate it shows it is running very uniform.

By Mr. Baldwin:

Q. What does this indicate to you as a matter of calibration of the 6-inch duct with the 20x20 duct?

A. It checks with it. It is satisfactory.

The Court: Do you know whether or not there are commercial installations made of the 7-inch filter?

The Witness: Well, I think there are, yes. There are different sized filters. I know there are some filters that are very small for special purposes.

(Testimony of Frank P. Rowley.)

Mr. Baldwin: Your Honor, this is a dirty job. I don't know whether the clerk can mark this or not.

The Clerk: LL.

(The article referred to was marked Defendants' Exhibit LL for identification.) [627]

By Mr. Baldwin:

Q. I hand you an article marked for identification Defendants' Exhibit LL and ask if you can state what it is.

A. This Exhibit LL——

Q. Pardon me. I withdraw the question for the moment.

Have you read and do you understand the translation of the French patent, No. 739,935 granted to Niestle, Defendants' Exhibit B, tab 15.

A. Yes.

Q. Will you identify, if you can, Defendants' Exhibit LL for identification?

A. Defendants' Exhibit LL is a small size filter, a 7x7, which was constructed after the teachings of the French patent to Niestle.

Q. Will you explain the circumstances under which this Exhibit LL was constructed?

A. I went to the Air-Maze factory, I studied the patent thoroughly and I discussed the construction with the research staff and the engineer at the Air-Maze Company, together with myself, and decided upon the type of construction which I was satisfied was representative of the teachings of the

(Testimony of Frank P. Rowley.)

French patent. And then this filter was constructed according to those instructions and this model was sent to me for test.

Q. Did you examine Exhibit LL thoroughly before you [628] tested it? A. Yes.

Q. I hand you Defendants' Exhibit CC and ask the relationship between Exhibit CC and Defendants' Exhibit LL.

A. Exhibit CC is one of the screens of which Exhibit II is constructed. Exhibit LL was constructed by using these screens, this mesh cut as these are, and packed together in the filter in such manner that the openings through this screen, which are the diamond-shaped openings, would pass the air from front to back of the filter.

The Court: The flow of the air was along the plane of it?

The Witness: At an angle.

The Court: At right angles?

The Witness: Not right angles, your Honor.

The Court: Well, to the plane——

The Witness: Right angles to the original screen but it was at an angle to the screens which went to make up the passages.

The Court: In other words, the flow of the air was as you have now indicated by your pencil?

The Witness: That is right.

The Court: It was introduced that way?

The Witness: That is right.

The Court: And not along the screen? [629]

The Witness: Not along the screen. It was in-



(Testimony of Frank P. Rowley.)

roduced along here which was at an angle to the actual screen members of this panel.

The Court: Very well.

By Mr. Baldwin:

Q. I call your attention to a clear window on one side of the Exhibit LL and ask if you will state the nature of what you see in that window.

A. The window shows the edge view of those screens, that is, the top view, and shows the paths through the filter which are formed by the screen members.

The Court: What is that, an asbestos bottom?

The Witness: It is just an insulation to keep the dust away.

The Court: And they were welded together?

The Witness: They were put there in spot weld.

The Court: Spot welded?

The Witness: Yes, sir.

The Court: Which was the front of this and which was the back, do you know?

The Witness: This side.

By Mr. Baldwin:

Q. By "this" side you mean?

A. This is the dirty side, the side that has the black. That was the entering side. [630]

Q. Would you compare the condition of the entering and leaving side?

A. The entering side is very heavily covered with black dust and the leaving side has black dust through the screen, but the leaving side of the

(Testimony of Frank P. Rowley.)

screen does not have the black dust on it. It is the entering side that has the heavy dust. [631]

The Court: What was that, now?

The Witness: The heavy dust is on the entering side of the screen.

The Court: Oh, I see.

The Witness: And the leaving side does not show the heavy dust that the entering side shows.

The Court: And what was that, Pocahontas ash and what is the other stuff?

The Witness: And carbon black. It is the same dust we used in the others.

By Mr. Baldwin:

Q. And what was the mesh of the woven wire material of Exhibit LL?

A. It is 30-mesh screen.

Q. And what is the mesh of the woven wire material of Exhibit CC?

A. That is 30-mesh also.

Q. I hand you Defendants' Exhibit DD and ask you to compare that construction with Exhibit LL.

A. The principle of the construction of Exhibit DD is the same as the construction of LL. The screen used in this (indicating) is of a coarser mesh than it is for LL, that is, coarser in DD than in LL, and the openings which pass through the filter are wider and a little larger in area for the Exhibit DD than they are for LL. Otherwise, it is the same or very [632] similar, it is the same type.

Q. I call your attention to the top window of

(Testimony of Frank P. Rowley.)

Exhibit DD and ask the general shape of whatever you see in there, what do you see there?

A. Well, I see the edge view of the air passages through the filter.

Q. And what is their general shape?

A. And the general shape of the air passages is a Z-shape as it goes from the front to the back of the filter.

Q. I call your attention to a similar window on Exhibit LL and ask you to compare the construction.

A. The construction is the same. Those in Exhibit LL are Z-shaped, just as they are in Exhibit DD.

Q. Do you mean the same or similar?

A. Similar.

Q. Did you test Exhibit LL?

A. Yes.

Q. Under what conditions?

A. I tested Exhibit LL in the small, seven by seven or six-by-six-inch square test area which I have described, and I tested those under exactly the same conditions as the other filters were tested, I used the same size velocity to the filter, the same dust feed, the same rate per square foot of area, the same relative rate, and used the same test procedure as for the other filters. [633]

The Court: That is, seven by seven?

The Witness: It is actually six by six, inside.

The Court: Six by six inside?

The Witness: That is right.

(Testimony of Frank P. Rowley.)

The Court: You did not fill the outside of that with paraffin?

The Witness: We did in here, yes, around in here. We did on this window but we did not on the sides.

By Mr. Baldwin:

Q. were the conditions under which you tested that Exhibit II identical with the conditions of the tests and as plotted in Exhibit KK from the third hour on?

A. Yes. Well, there is one point I want to explain when we come to the data.

The Court: You have a separate chart there?

The Witness: Yes.

Mr. Baldwin: Yes.

Q. Did you or did you not coat Exhibit LL with oil before you tested it?      A. Yes.

Q. With what oil?

A. With the same oil. All of these were coated with S.A.E. 40 oil.

Q. Is that a light or heavy oil?

A. It is medium heavy. [634]

Mr. Baldwin: I ask that this document be marked as Defendants' Exhibit MM for identification.

The Court: Exhibit MM, test chart.

The Clerk: MM.

(The document referred to was marked Defendants' Exhibit MM for identification.)

(Testimony of Frank P. Rowley.)

By Mr. Baldwin:

Q. I hand you a paper marked for identification Defendants' Exhibit MM and ask you if you can identify it.

A. Yes.

Q. What does that show?

A. This shows the result of the test which I made on filter marked Exhibit LL, and the conditions of the tests on the units shown on this diagram, the same as on the others.

The Court: And were the conditions all the same?

The Witness: All the conditions were the same.

The Court: The rate of flow of air?

The Witness: That is right, rate of flow.

The Court: And the percentage of grams?

The Witness: And grams.

The Court: And so on, and so forth?

The Witness: That is right.

By Mr. Baldwin:

Q. Would you read some representative data from the arrestance curve of Exhibit MM? [635]

A. The arrestance curve starts at 75 per cent and gradually rises until it reaches about 81.6, at 9 hours. From there it tapers slightly down. At the end of 14 hours it has reached slightly under 81 per cent arrestance.

Q. Would you read some representative figures from the resistance curve?

A. The resistance curve starts at .1 inches and rises until at the end of the test or at the end of 14 hours it has reached .44 inches.

(Testimony of Frank P. Rowley.)

Q. Would you explain the dirty condition of Exhibit LL?

A. This is the condition of the filter after it was taken out of the test, that is, it was taken out of the test, then I packed it, as it came in here, and sent it parcel post to Los Angeles, and this is the condition it arrived in, or substantially the condition, excepting for what dust was shaken off during shipping.

The Court: How do you get this percentage? You weigh the filter first, and then weigh it afterwards?

The Witness: Well, we could do that, but we get the percentage——

The Court: Oh, by that pressure drop, by that water “business”?

The Witness: No. We get the pressure of the filter resistance in inches of water.

The Court: Yes. [636]

The Witness: But, now, we get the weights of the dust going into the filter, by actually weighing the dust which goes in, and then we filter the air which leaves the filter and take the absolute increase in weight in that filtered material, to get the amount of dust which is in the air after it leaves the filter.

Mr. Baldwin: All right.

Q. So that, to recapitulate, if I might, for just a moment, you deduct what is downstream from what you fed in upstream?

A. That is right, and that is the amount left in the filter.

(Testimony of Frank P. Rowley.)

Q. Is this Defendants' Exhibit LL the only filter constructed according to the French patent submitted to you by Air-Maze Corporation?

A. Yes.

Q. Does the data plotted on Exhibit MM indicate to you a good or a bad filter?

A. This indicates a good filter.

Q. Does the fact that the resistance rose at the end of 14 hours to .44 inches of water indicate that this filter should be classified as an unsatisfactory filter?

A. No.

The Court: What does it indicate?

The Witness: Well, it indicates the pressure rise. [637]

The Court: Well, but I mean insofar as its utility is concerned.

The Witness: Well, it indicates that it is a practical filter, because it has a rather high efficiency, but also we know that, as far as the filter is concerned, we could change the screen in here and put in a little bigger screen and we would have a little greater resistance. You see, we have a very fine screen there.

The Court: But with that very fine screen and with this high resistance, pressure drop, doesn't it mean you would have to take it off and clean it more often?

The Witness: You would have to take it off and clean it more often than one that would run twice that long, that is true, but you are taking a very great percentage of dust out of the air. The filter,

(Testimony of Frank P. Rowley.)

as to the value of it, it depends on the purpose. Now, if you are satisfied to take out 75 per cent and you have a longer-life filter, and if you want to take out 80, or something like that, per cent, the more dirt you take out, the faster it is going to fill up. Furthermore, the filter will have to be designed to take out dirt, and when you do that you are going to have a higher resistance filter. It is a different construction, a different type.

The Court: Then, when you want to take out a hundred per cent, you use the spun glass, is that right?

The Witness: That is one way of getting it out, but [638] that is a very high resistance and you have to change there.

The Court: Well, it starts out with a high resistance, doesn't it?

The Witness: Yes.

The Court: It would have to?

The Witness: It would have to, to take it out.

The Court: What was the resistance in that spun glass filter, where did you start out, in point of inches of water?

The Witness: For this velocity through the filter it would probably start out at six or eight inches or more than that. It was pretty high.

The Court: Did you test that on your spun glass filter?

The Witness: Not exactly on that basis. We expanded the area. But if you tried to carry the air through that filter at this 300 feet, it would have a



(Testimony of Frank P. Rowley.)

very high pressure drop. It would be impractical for any air-conditioning system, to use that kind of a filter.

The Court: Because of the high pressure drop?

The Witness: Because of the high pressure drop and then because of the cost and everything else.

The Court: You mean the cost of the original installation or the cost of forcing the air through them?

The Witness: Both.

The Court: Both?

The Witness: Yes. [639]

The Court: You would have to put fans or suction pumps or something in it to get air in it?

The Witness: You would, or else you would have to have a very large area of the filter if you were going to force the air through with anything like 300 or 500, you would have to have very large fans.

The Court: Very large fans?

The Witness: High-pressure fans.

The Court: Which would be expensive to install and maintain?

The Witness: Yes, that is right.

The Court: Well, that would be true of any filter which would operate 100 per cent, wouldn't it?

The Witness: Well, it would be one of these types we are speaking of. There is an electrostatic filter which is very efficient, and of course that can be designed at low resistance. That is a different type of filter.

(Testimony of Frank P. Rowley.)

The Court: I see. And has the additional disadvantage in maintenance of using electricity?

The Witness: Yes.

The Court: The cost of electricity?

The Witness: Yes.

By Mr. Baldwin:

Q. Have you had experience with filtering ordinary dirty air under city conditions? [640]

A. Yes.

Q. Under average city dust conditions, about how long will it take that filter, Defendants' Exhibit LL, to collect the amount of dust it collected in your 14-hour test?

A. Of course, city conditions vary so much, it is difficult to give an absolute answer to that, because it would depend on where the dust is taken in the city and how high a level, and various things, but I would say from 30 days to 40 days, maybe, depending on the conditions.

The Court: Well, it depends on the city, first?

The Witness: The city, that is correct, where it is.

The Court: Where it is in the city?

The Witness: Where it is in the city, and the elevation make a lot of difference.

The Court: That is the elevation above ground?

The Witness: Yes.

The Court: Or elevation above sea level?

The Witness: Above the ground. If you are close to the ground, you have a lot of heavy dust that you do not get when you get up at higher levels.

(Testimony of Frank P. Rowley.)

By Mr. Baldwin:

Q. Do you know when this filter panel, Defendants' Exhibit LL, in practical use would have to be cleaned, about how often?

A. At least once a month, I would say. [641]

\* \* \* \* \*

Q. Professor Rowley, are there any figures on dust conditions in cities in the United States?

A. Yes, there are. There have been many surveys made, and the conditions are variable. They run in wide ranges of dust.

Q. What is the range of a city?

A. It is probably about one-tenth of a grain per thousand, one-tenth of a grain per thousand cubic feet, up [642] to two.

The Court: Two grains?

The Witness: Two grains, perhaps. I would have to check that up. I can't give you those exact figures.

By Mr. Baldwin:

Q. So that when you answered my question a moment ago under average city conditions, what was the basis of your answer?

A. It was on the basis of the average dust which I would expect in a city, in the average city.

Q. Based on your studies? A. Yes.

The Court: Well, in the average city, I suppose every city has a sand pit or a cement plant. Would it be the average dust around the home or residence?

The Witness: Yes, around the city home, yes.

(Testimony of Frank P. Rowley.)

The Court: Around city homes?

The Witness: Yes.

By Mr. Baldwin:

\* \* \* \* \* [643]

Q. You have stated that you coated the media, the filter media, of Exhibit LL with S.A.E. 40 oil before you tested it?      A. Yes.

Q. Would that S.A.E. 40 oil fill the interstices of this woven wire material?      A. Yes, it will.

The Court: Solid?

The Witness: It will fill them solid. It depends on the temperature as to how long it stays in there, the temperature of the oil and the position of the screen.

The Court: By the way, were all these tests conducted under the same temperatures?

The Witness: Yes.

The Court: What temperature was that?

The Witness: About 75 or 78. It is a laboratory temperature that we maintain at about 75 degrees.

The Court: Does the air increase in temperature?

The Witness: No, it is a large laboratory room.

The Court: I mean when you introduced it to this combined [645] duct, does the temperature increase?

A. No, there is no change. There isn't enough of a change.

The Court: It is not enough of a speed to increase the temperatures?

The Witness: No. You wouldn't get any change.

(Testimony of Frank P. Rowley.)

By Mr. Baldwin:

Q. How did you put the oil on Exhibit LL before you tested it?

A. I soaked the filter in a pan of the oil, both sides, so we submerged it completely in the oil. Then after it had been submerged and completely covered with oil we drained the oil off by hanging the filter up on one corner and drained the oil for 24 hours before the test.

Q. Did you know whether or not the oil drained out of the interstices of the filter media in 24 hours?

A. It would partly, yes. It depends on the position.

The Court: Did it?

The Witness: Yes, it did drain out, I would say. In the filter I couldn't tell but it would drain out.

The Court: From what you could see it had drained out?

The Witness: Yes, it had drained out.

By Mr. Baldwin:

Q. You have stated that you have had experience as a consulting engineer. Has any of that consulting work been in [646] connection with filter panels similar to the Far-Air filter or the P-5 filter involved in this action?

A. Yes, with these types of filters.

Q. Has it been with impingement type filters?

A. Yes.

Q. To what extent have you consulted in that manner?

(Testimony of Frank P. Rowley.)

A. Well, I have done a considerable work along programs. Last year, for instance, I was on one that took me for a whole year with the Orange-Corning, and I have been on programs of that type. I can't say just how many hours, how many days or years that I spent on a good many problems.

What is the nature of the problems which are brought to you by these consultants?

A. Well, some of them are testing their filters that they have, consulting with them as to what changes might be made after we find out what the conditions are, changes in dust, changes in the method of oiling or greasing, like putting adhesive on the filter to get either longer life or to change the resistance by changing the fiber construction of the filters, and so forth. It is variable depending on what their problems are.

Q. Are you or are you not able to help them arrive at the filter characteristics which they desire?

A. I think so. Yes.

Q. If a filter manufacturer brought you Defendants' [647] Exhibit LL and asked you what he should do to it in order to lower its resistance, would you be able to advise him from your experience?      A. Yes, I would.

Q. What would be the direction of the change which you might suggest to him?

A. Well, I would suggest changing the screen, opening up the mesh and also probably changing the size of the passages through the filter, making

(Testimony of Frank P. Rowley.)

changes which would affect the resistance of the air flowing through it.

The Court: In other words, you would simply reduce the mass of the media?

The Witness: Yes, and the arrangement of it probably.

By Mr. Baldwin:

Q. Have you read the file wrapper of the patent in suit? A. Yes.

Q. I quote you from page 21 of the file wrapper where this statement is made, speaking of the filter shown in the Manning patent, No. 2,079,297.

I show you Defendants' Exhibit B-9, which is the Manning patent, No. 2,079,297. I quote from the file wrapper:

"The result is that a——"

The Court: The file wrapper? Is that in evidence?

Mr. Baldwin: Page 21. Yes, your Honor. It is Exhibit [648] 1-A.

The Court: That is the file wrapper of the patent in suit?

Mr. Baldwin: That is the file wrapper of the patent in suit.

The Court: Not of the Manning patent?

The Witness: No.

The Court: I beg your pardon. I thought you were reading from the file wrapper in the Manning patent.

Mr. Baldwin: It is a comment about the Manning patent, your Honor.

(Testimony of Frank P. Rowley.)

The Court: I see. Page what?

The Witness: Page 21.

The Court: Yes?

The Witness: About the middle of the page, the last sentence of the paragraph, the last sentence of the first paragraph on the page, beginning:

“The result is that a substantial portion of the dust is carried through the filter by large streams of air which are not effectively impinged against the surface of the filter and accordingly the paper is not effective in removing dust from air.”

Q. Have you had any experience with filters constructed according to the Manning patent? [649]

A. Yes.

Q. I hand you Defendants' Exhibit C and ask if that resembles a filter which you have tested.

A. Yes.

Q. Is it exactly like one you have tested?

A. I would not say exactly like it. I think the cells in this filter are a little larger than the one I tested. The same design.

The Court: We will have the afternoon recess.

(Short recess.)

By Mr. Baldwin:

Q. I believe you stated that you had tested a filter like Defendants' Exhibit C except that the corrugations were somewhat smaller, is that correct?

A. That is correct; the same type.

Q. Would you state when you tested such a filter?

A. I tested them in 1937, I tested several of



(Testimony of Frank P. Rowley.)

them, and just prior to that I tested them and since then.

Q. What work were you doing in 1937 with this filter?

A. In 1937 the Association of American Railroads decided to have a series of tests made to determine the efficiency or effectiveness of the various filters that were then used in railroad work. They came to Minnesota and asked me to take up that program, take charge of it, so I ran during that summer a long series of tests in which I used about 14 [650] different types of filters in testing to determine their arrestance, resistance, and so forth.

Q. Do you have the Manning patent in front of you? A. Yes.

Q. There is shown, is there not, a layer of expanded metal part way through the filter media of that patent, is that correct?

A. That is correct, in Fig. 2.

Q. Did the filter which you tested in 1937 have such a layer of expanded metal? A. No.

Q. Will you turn to the Kaiser patent, which I believe you have in front of you as Defendants' Exhibit B, tab 8. Is there shown there any construction which is more nearly like the filter which you tested in 1937? A. Yes, there is.

Q. Which figure would that be?

A. It is more nearly like Fig. 7. There was a little break as shown in Fig. 5.

The Court: That is the American air filter?

Mr. Baldwin: No, that is the Detroit air filter, your Honor.

(Testimony of Frank P. Rowley.)

Q. What was this filter known as at the time you tested it in 1937?

A. It was called the Arco, American Radiator Company, [651] at that time.

Mr. Baldwin: I call the court's attention to the fact that the Manning patent is assigned on its face to the American Radiator Company.

Q. When you say it resembled Fig. 7 of the Kaiser patent, what does that mean regarding the corrugations on the two faces of the panel?

A. The corrugations where they meet in the center make an abrupt angle with each other. The corrugations on the leaving side are a little smaller than they are on the entering side of the filter.

Q. Do you recall how this filter, similar to Defendants' Exhibit C which you have stated **was** then known as the Arco filter, do you recall how it tested in your tests of 1937?

A. Yes. It tested about 75 per cent or thereabouts.

Q. Seventy-five per cent what?

A. Arrestance.

Q. And do you remember anything about its resistance?

A. I believe it started about two tenths of an inch resistance.

Q. What do you remember of its dust holding capacity?

A. It held, I believe, around between five and six hundred grams.

Q. How did the conditions of this test of the Arco [652] filter in 1937 compare with the tests

(Testimony of Frank P. Rowley.)

which you have reported on here relating to Defendants' Exhibits HH, II, JJ, KK and MM?

A. Well, the tests procedure was the same. The dust used in those filter tests was a little different. We used there 50 per cent Pocahontas ash, same type, and 20 per cent carbon black, and 20 per cent Cottrell ash and 10 per cent Fuller's earth, so the dust mixture was a little different.

Q. Were those differences in dust of a nature to affect—in what degree would those differences of dust affect the comparative results of the Arco filter in 1937 and the Air-Maze tests in 1951?

A. I believe the test they used in 1937 would give a little higher rise in pressure and a little lower arrestance than the type of dust that I use now.

Q. I read to you from the file wrapper of the patent in suit, Exhibit 1-A, the following passage—

Mr. Leonard S. Lyon: What page?

Mr. Baldwin: This is page 73 of the file wrapper, the last sentence of the paragraph which ends in the middle of the page, which comments on the patents to Kaiser and Manning as will be seen by reference to the preceding portion of the same paragraph.

“Because of the straightening action of the walls of the passage on the direction of airflow, [653] it is easily demonstrated that there is little collection of dust in such filters beyond the entrance to the passages.”

(Testimony of Frank P. Rowley.)

Q. Did you examine the passages of the Arco filter which you tested in 1937?      A. Yes.

Q. Did you examine those passages in more than one filter of that same type?      A. Yes.

Q. What did you find as to the distribution of the dust in those passages?

A. I found that it was distributed through the filter with more of it in the front of it but it was distributed through the filter.

Q. Did you find dust in all portions of the passages?      A. Yes.

Q. Slight or medium or a lot or what?

A. Well, I found considerable dust all through it. It was fairly well distributed. It was a little heavier at the entrance and also at the break at the center. But it was all distributed through the passages.

Mr. Baldwin: This next exhibit, your Honor, I only have one copy of, but I have photostated three pages. I wonder if they may all have—perhaps the exhibit could have the first designation and the others then be clipped together with a [654] subscript or something of the sort.

The Court: What pages?

Mr. Baldwin: Pages 1, 8 and 9.

The Court: I will mark the exhibit NN and page 1 will be NN-1, page 8 will be NN-2 and page 9 will be NN-3.

(The documents referred to were marked Defendants' Exhibits Nos. NN, NN-1, NN-2 and NN-3 for identification.)

(Testimony of Frank P. Rowley.)

By Mr. Baldwin:

Q. I hand you a paper marked for identification, or a pamphlet marked for identification, Defendants' Exhibit NN, and ask you if you can identify it, that is, the complete pamphlet.

A. Yes. [655]

By Mr. Baldwin:

Q. What is it?

A. That is the report on the result of the research work which was done under my direction at the University of Minnesota, to determine some of the filter performance factors, and the paper is entitled "Air Filter Performance as Affected by Low Rate of Dust Feed, Various Types of Carbon, and Dust Particle Size and Density." And this paper was presented at the American Society of Heating and Ventilating Engineers' forty-fifth annual meeting, January, 1939, and it gives the results of some of our research program as I have stated.

Q. Do you remember how long this research took?

A. I can't state just exactly how long this particular research took. This is only a part of a considerable program that we were conducting. I would say that the work on here would take at least six months.

Q. Does the name "Frank B. Rowley" near the top of the page, which is underneath the title, refer to yourself?

A. Yes.

Q. Would you state what the subject-matter was upon which you ran this paper, what were the articles which you did the research on?

(Testimony of Frank P. Rowley.)

A. They were different types of filters. We had four different types of air filters, and those filters are typical of certain designs and they are described, on page 1, as A, [656] B-1, C, and D, the first two being in the first column.

Q. I note that there is no identification as to the manufacturer of these various filters. Why is not the manufacturer shown?

A. It has been our policy in these researches not to give the manufacturers' names; merely to describe the object as something which would be constructed so it could be understood.

Q. Do you feel free, at this time, to identify these filters?

A. I think it would be all right. It is so late, now.

The Court: When was this published?

The Witness: In 1939.

The Court: When?

The Witness: In 1939.

By Mr. Baldwin:

Q. Will you state what those filters were, A, B-1, C, and D?

A. Well, A was an American filter.

B was an Owens-Corning.

And C was the Arco (American Radiator, as we called it at that time).

And D was a cloth filter of a different type.

Q. You state that B was an Owens-Corning filter. Would you give just a brief description of it?

A. Well, it was an Owens-Corning filter made

(Testimony of Frank P. Rowley.)

of viscous coated fiberglass, which is packed in a filter frame, known as throw-away type.

Q. Would you refer to page 9 of Exhibit NN, the photostat of which is designated NN-3, and explain table No. 7 at the top of that page?

A. Well, table No. 7 shows the relation between dust density and filter performance, and the dust feed stated there was 40 grams per hour, and the face air velocity was 300 feet per minute. And the note down below states that "All values based on a resistance rise of 0.15 inches of water across the filter." In other words, we take that rise, as what we assume the life of the filter, for the purpose of these tests, in order to get comparative values.

Q. That was something of an arbitrary limit?

A. That was an arbitrary limit, so we could get relative values.

Q. What is column 1?

A. Column 1 gives the different types of dust which we used in the tests, and those different types of dust which are enumerated there, and first we determined the density of that dust in grams per cubic centimeter, and that density in the second column, in grams per cubic centimeter, is what we term the jolted density, that is, there is a maximum density, we take the dust and jolt it down until we reach the [658] maximum density of the dust, and we get the grams per cubic centimeter.

The next column is merely the conversion to pounds per cubic foot.

Q. Would you state where the lightest and heaviest dust appears in these columns?

(Testimony of Frank P. Rowley.)

A. The lightest dust appears at the top and the heaviest at the bottom. They are arranged according to the densities.

Q. Explain the rest of the table.

A. The important part, then, is the last three-named groups there.

The first group says "Life in Hours." Under this heading is the life in hours of the four types of filters, A, B-1, C, and D, and those figures of life in hours represent the number of hours it took to raise the resistance to .15 inches in these tests, of water.

Next, I can explain those columns. The next four columns are headed, "Dust Holding Capacity in Grams," and those figures represent the amount of dust in grams that was held by each filter, with each type of dust, with the pressure rise of .15 inches.

And the last four columns are "Arrestance in Per Cent" for the four types of filters, with each of the dusts that are shown in column 1, and those arrestances are based on [659] the average arrestance during the time that the filter increased in resistance .15 inches of water.

Q. What were your general conclusions at the time of making this test, as to the effect of density upon the data of filter performance?

A. Well, the density has a very great effect on all of those three items, the life in hours, the dust-holding capacity in grams, and the arrestance in per cent. However, the arrestance in per cent is not usually a factor of density. It may be and it may not, but depending upon the type of dust, but the



(Testimony of Frank P. Rowley.)

actual life in hours, which is parallel in a way to the dust-holding capacity, is very materially increased.

For instance, in filter A it increases from 4.8 hours to 43.0, but I should point out that that 43.0 was not actually finished. That was an estimated value.

The last one we have there is for boneblack dust.

But for B-1, for instance, the life in hours from lampblack, the second density there, the second dust, varies from 1.8, which is the next to the lowest of the densities, up to 21.4 hours for the heaviest dust, and so on.

The filter C varies from 2.8 hours to 22.6 hours.

Now, the dust-holding capacities likewise increase at substantially the same ratios.

I have not read filter D in here because actually that is a strainer type. It isn't an impingement filter. [660] These other three are impingement filters.

Q. I hand you Plaintiff's Exhibit 11 and Defendants' Exhibit JJ and ask you to compare the rate of rise of the resistance curve of the Farr filter represented by the patent in suit on Exhibit 11, and the Farr filter exhibit in suit as tested by you on Exhibit JJ. Will you compare the rate of rise of the resistance curves?

A. Well, the rate of rise is more rapid for the filter as reported by me on type Exhibit JJ than it is for the same filter as reported by, I believe, Mr. Duncan on Exhibit 11, even though my velocities were 300 to his velocities of 519.

(Testimony of Frank B. Rowley.)

\* \* \* \* \*

Q. Have you ever tested the same filter at two different velocities? A. Yes.

The Court: The Farr filter?

The Witness: Not the Farr. The same type of filter. I have tested filters of different types, but not the Farr.

The Court: Oh, I see. Others?

The Witness: Other filters, yes.

The Court: J-5, P-5? Was it P-5? [661]

The Witness: Neither the P-5, because I did not have them when I was running these other tests.

The Court: That was when you wrote this paper?

The Witness: Along about that time. There was another paper.

By Mr. Baldwin:

Q. Is the effect of a change in velocity of a given filter, with all other conditions maintained constantly, is the effect of the change of the velocity alone predictable? A. Yes.

Q. And what effect does a change of velocity have, what would be the effect of that change in velocity on a resistance curve in general?

A. It raises the resistance curve at all points.

Q. Does it change the rate of rise of such a resistance curve? A. Yes.

Q. To what degree?

A. Well, the resistance is varied as some power of the ratio of the velocities varies. For this type of filter, the resistance varies about 1.7 of the velocity rate. In other words, we take the ratios of

(Testimony of Frank B. Rowley.)

the velocity and raise them to 1.7 power and you have the ratio of the resistances. It is often stated as proportion to the square of the velocity. Actually we haven't that 1.7. [662]

Mr. Leonard S. Lyon: Your Honor, in view of the previous answer of the witness——

The Court: Raise your voice.

Mr. Leonard S. Lyon: In view of the previous answer of the witness, I don't think the record is understandable as to what he means by "this type" of filter.

The Court: I don't know what he means by "this type of filter."

The Witness: I mean filters like the Farr.

The Court: You mean filters that use the impingement method?

The Witness: The general impingement method, that are constructed similar to the Air-Maze and the Farr.

The Court: Well, of course, the plaintiff contends that none of them are constructed similar to the Farr.

The Witness: Well, they all have the same type of resistance elements in them.

The Court: In other words, it is that general impingement type of filter or characteristic of an air-cleaning filter or an oil filter?

The Witness: It is the general principle of mechanics which states that if you have air flowing through a given resistance, a given block of materials, the resistance is proportionate to something

(Testimony of Frank B. Rowley.)

like the square of the velocity, and that is true for all arrangements. It may not always be [663] the square, and this isn't, but it is very close to that.

The Court: 1.7?

The Witness: 1.7 in this case.

By Mr. Baldwin:

Q. Do you have an opinion as to why there is a different rate of rise in the resistance curve in Plaintiff's Exhibit 11 and Defendants' Exhibit JJ?

A. Yes, I do.

Q. What is that opinion?

A. I believe that it was due to a different type of dust used in the test apparatus.

The Court: Did you ever use, in any of your tests, the dust which is described in Plaintiff's Exhibit No. 8 as having been used in connection with the tests made on those filters?

The Witness: No.

The Court AC spark plugs, standardized fine air cooler test dusts?

The Witness: No, your Honor, I never have. I never used that air filter test dust. [664]

The Court: You never used it?

The Witness: I never used it.

The Court: Very well.

The Witness: But it is a very much denser dust from the relation of density to resistance.

By Mr. Baldwin:

Q. I hand you a paper marked for identification Defendants' Exhibit OO—pardon me. I will withdraw that question for the moment.

(Testimony of Frank B. Rowley.)

Are you familiar with the construction of the Air-Maze P-5 filter involved in this suit?

A. Yes.

Q. I hand you a paper marked for identification Defendants' Exhibit OO and ask if you recognize that paper.

A. Yes.

Q. What is it?

A. It is a United States patent issued to O. H. Schaaf, dated September 4, 1951, No. 2,567,030, which describes the Air-Maze type of construction and the P-5 panel.

Q. Have you read this patent, 2,567,030?

A. Yes.

Q. In your opinion, does it correctly describe the Air-Maze P-5 filter?

A. Yes.

Mr. Baldwin: Your Honor, at this time I offer in evidence [665] Defendants' Exhibits HH, II, JJ, KK, LL, MM, NN, and OO.

The Court: Admitted.

(The documents referred to were received in evidence and marked Defendants' Exhibits HH, II, JJ, KK, LL, MM, NN, NN-1, NN-2, NN-3 and OO respectively.)

[Printer's Note: Defendants Exhibits HH, MM, and OO are reproduced in Book of Exhibits.]

The Court: Are you offering this in connection with the special defenses raised by your answer, this Patent No. OO?

Mr. Baldwin: No, your Honor.

(Testimony of Frank B. Rowley.)

I don't recall whether I offered Defendants' Exhibits DD, EE, FF and GG. If not, I offer them at this time.

The Court: They are admitted.

(The documents referred to were received in evidence and marked Defendants' Exhibits DD, EE, FF and GG respectively.)

By Mr. Baldwin:

Q. Professor Rowley, will you describe the construction of the Air-Maze P-5 filter panel briefly?

A. The Air-Maze P-5 consists of layers of corrugated screen, the corrugations being in the form of Zs and they are assembled one above the other in such ways that the corrugation lines cross.

Q. What is the nature of the contact between the adjacent layers of the crimped screens?

A. It is virtually a point contact.

Q. I hand you Plaintiff's Exhibit 6, which is the filter [666] media of the Air-Maze P-5 filter, and ask you to take two adjacent layers of that filter media and following a single crimp of one layer will you state how many corrugations or crimps of the adjacent layer are crossed?

A. I would say that it varies a little with the shifting, but about five, four to five points probably.

Q. I think you misunderstood my question. I asked how many corrugations of one screen are crossed by a single corrugation of the other.

A. I thought you asked me the points. I will change that then.

(Testimony of Frank B. Rowley.)

I would say four, at least four.

Q. And how many points of contact between the crimp of one screen and the crimps of the layers of the adjacent screen?

A. I think there are about five.

Q. Now if you take two adjacent layers of that filter media and follow along the single crimp of one layer through the filter panel from one face to the other, what is the nature of the opening between the two screens as you travel along that one crimp using it as a guide line?

A. Well, the nature is, first, where it passes over the crimp it is sort of a triangular opening and then expands into a larger, sort of a diamond-shape, which is equal to the size between the two crimps, and then goes back to [667] the triangle again. It varies in size as it passes through the filter.

Q. Do you find any passageway through the filter from one face to the other of a uniform cross-section?

A. No.

The Court: What is that, do you find any pathways through the filter of a uniform cross-section?

The Witness: I understood that to mean any tube-like pathway. Of course you can follow in one groove but they don't go to the extent of the other screen. I understood any pathway bounded by the two screens.

The Court: Well, there are pathways there. That is what you are talking about, is it not?

The Witness: I think there might be a little misunderstanding as to whether we are talking about

(Testimony of Frank B. Rowley.)

a pathway as just the groove in the screen or whether we are talking about the pathway which is confined between the two screens. If the pathway was to mean just the channel or groove in here (indicating), that would be different than if it meant the channel confined above and below the two screens.

Mr. Baldwin: I asked him to define the nature of the space between two adjacent layers.

The Court: I did not understand that to be your question. Let me hear it again.

(The question referred to was read by the reporter as [668] follows:

("Q. Do you find any passageway through the filter from one face to the other of a uniform cross-section?")

The Court: I do not understand the question, any passage through the filter of a uniform cross-section.

Mr. Baldwin: Let me ask this question:

Q. Are you familiar with the Farr patent in suit?      A. Yes.

The Court: Well, there are passageways through that filter.

The Witness: Yes.

The Court: Of a uniform cross-section. What does he mean by that?

The Witness: I take it that we are discussing one of these passages through here in combination with the next screen above and those, if we follow



(Testimony of Frank B. Rowley.)

this channel through, varies because the crossing channels from above are crossing it so it changes in size or area. If I were to follow this crimp——

The Court: But I still do not understand what you mean by a uniform cross-section. Those passages, if they are zig-zag are going to be alternate and they are going to be the same, and if that is a uniform cross-section there are passageways through it. [669]

The Witness: I suppose if we take the whole area it is a uniform passageway over the whole area, but if we follow one passage through here then the area of that passage is different when it crosses the next screen above it, when it cross the corrugation of the next screen above. The area between this crimp and the one above varies in size as we follow one of these crimps.

The Court: But it is still a passageway through there.

Mr. Baldwin: But a non-uniform cross-section, is the point he is making.

The Court: You mean it is not a uniform passage?

Mr. Baldwin: That is correct.

The Court: Very well.

By Mr. Baldwin:

Q. I hand you Defendants' Exhibit J and I ask you whether the red and green lines correctly represent the crossing ridges of two adjacent layers of the crimped screen in the P-5 filter panel.

A. Yes.

(Testimony of Frank B. Rowley.)

Q. Do the small circles represent the crossing points which I had you count a while ago?

A. Yes.

The Court: I am still thinking about that other answer. You say there is not a uniform passage?

The Witness: It is not uniform if we follow through—— [670]

The Court: It is not uniform to the opening.

The Witness: It is not uniform area. It changes form as it passes over the various parts between the contact points of the upper and lower screen.

The Court: That is to say, it goes through the interstices?

The Witness: I don't mean the interstices between the screens.

The Court: I know, in the humps.

The Witness: If it were a solid material.

The Court: Instead of going through the hump, it goes over the hump?

The Witness: No, it isn't that. Instead of using screens in these two materials here if we used a solid material we would still have that.

The Court: We had a demonstration of that here.

The Witness: We would have that changing cross-section if you followed one of those channels through. Of course it does actually go through the screen too.

The Court: Go ahead with your examination.

Mr. Baldwin: I am having another exhibit marked.

(Testimony of Frank B. Rowley.)

The Clerk: PP.

(The article referred to was marked Defendants' Exhibit PP for identification.) [671]

By Mr. Baldwin:

Q. I hand you a piece of metal marked for identification Defendants' Exhibit PP and ask if you can state what it represents.

A. This represents the space for the air and dust to pass between the screens. It represents the area between two screens eliminating the fact that we have screen members. If these screens were solid material and this then would represent the open passage through the solid material.

Q. Can we say that that metal represents air?

A. That metal represents the air space or air in there; that is correct. That is the space between those two corrugated screens.

Mr. Leonard S. Lyon: Maybe your Honor might ask if that is not a core of the device?

Mr. Baldwin: The metal represents the air between two screens as near as we could cast it.

Q. What do those holes in Exhibit PP indicate?

A. They indicate the points where the corrugations cross, the contact points.

The Court: In other words, that is solid?

The Witness: If you freeze the air and take it out, I suppose that is one way you would have that area.

(Testimony of Frank B. Rowley.)

By Mr. Baldwin:

Q. I have handed you Defendants' Exhibit J. Do the [672] small black circles properly represent the points where the ridges of one layer cross the ridges of an adjacent layer in the Air-Maze P-5 filter? A. Yes.

Q. Following the single arrow on one side and considering that to represent a small jet or stream of air entering at a single point on the entrance face of the P-5 filter, what is the nature of the flow of air through that P-5 filter panel after it leaves the front face of the filter on its way through?

A. Well, the nature of the flow is in the general direction from front to back. The air, however, being split into different channels each time it approaches one of these circles or points. Now it splits in that path first into two, then later divides again each of them, making three, and it divides four times, and actually that stream of air could come out in six different streams provided that this filter was built of something which wouldn't let it pass through the screen, if we considered that possible. That is a possibility of the division of these channels or passage-ways through the filter.

Q. Do I understand you to mean that the heavy dark wavy lines of Exhibit J indicates the passage of the air through the screen or independently of the screen?

A. Independently of the screen. [680]

Q. You have stated you are familiar with the construction of the Farr patent in suit. When a

(Testimony of Frank B. Rowley.)

stream of air enters at a given point at the entrance face of the Farr filter panel, how many directions can it move laterally without going through the screen of the mesh members?

A. It just moves in one channel.

Q. And the action shown in Exhibit J of the Air-Maze P-5 would be possible or impossible, in your opinion, in the Farr patent structure?

A. It would be impossible.

The Court: You mean that it would move into the Farr device if it was not screened material, if it was solid material?

The Witness: That is right. I am assuming that these channels are bound by other material.

The Witness: That is right. I am assuming that these channels are bound by other material.

The Court: And the same assumption as your P-5 filter?

The Witness: That is correct. It shows the difference in principle of the two filters.

The Court: But neither of them are made of solid material. It does not call for it to be made of solid material.

The Witness: No, but in so far as it seems to me the Farr filter functions to have open channels going through which illustrate that principle. Otherwise it would be no different than any other filter with open screens, it seems to me. [681]

The Court: Well, actually there is a considerable turbulence in the breaking up of the air. It would

(Testimony of Frank B. Rowley.)

be impossible to follow the stream of air flowing through either one of them.

The Witness: Yes. In all filters that is true.

The Court: In other words, it goes around and over the screen. That is the purpose of it.

The Witness: That is true. The principle in filters is the fact that one filter is designed with a special channel. But that doesn't change the principle of the filter.

The Court: The idea is to create turbulence of change of direction to bring it into contact with your material?

The Witness: That is right. You see, in many filters they create this turbulence and get the surface contact by different kinds of fibers or filaments. For instance, they use animal hair and fiberglass, steel wool and many kinds of material.

Now screen is another way of getting a lot of filaments put together and it has been used that way many times. It is just a matter of getting more filaments in the ordinary manner in the filter. If you put a screen there regardless of how you try to direct the air of that screen it is going to go through the screen in one case the same as the other.

The Court: If the air were introduced at a higher rate of speed into either one of the filters there would be [682] more turbulence?

The Witness: In any filter that is true.

The Court: In any filter?

The Witness: Yes.

The Court: There would be more turbulence?

(Testimony of Frank B. Rowley.)

The Witness: There would be more turbulence, and the resistance would vary with how close the impact was with the first filament in the filter and also the filter efficiency. [683]

By Mr. Baldwin:

Q. Professor Rowley, does the Farr patent state that all of the air flows through the openings in the screen of the mesh members?

A. No, it doesn't.

Q. Does the Farr patent state that some of the flow is down the triangular passageways?

A. Yes.

Q. Is that the kind of flow which you have been trying to describe in the Farr and the Air-Maze P-5 filters?      A. That is right.

Q. And it flows down the passages in the Farr patent, how many passages could it flow down?

A. After it enters the filter, it could flow in only one, out past the other screens.

Q. And in the Air-Maze P-5, after it enters the face of the filter, if you regarded the screen as forming passages, how many passages could it flow down?

It could increase on the way through, and as it continued forward on the way it would come out in six passages.

Q. I hand you Plaintiff's Exhibit 9, which purports to show the loading of dust upon the filter media of a filter constructed according to the Farr patent in suit. Would you examine the photograph marked 9-E, in which the plaintiff has stated the

(Testimony of Frank B. Rowley.)

air movement is upward from the bottom of the [684] picture, and state the nature of the loading in the crimps of the screen mesh material?

A. Well, from the photograph it would appear to me that the loading is largely in the entering face and in the entering side before it comes to the angle or bend in the crimp.

Q. And where do you find the bulk of the dust deposited in the Farr filter construction?

A. From the photograph it appears to be in the entering side, I would say of the first third or a little more of the filter up to the bend.

Q. Before it reaches the bend?

A. Before it reaches the bend.

Q. I hand you Plaintiff's Exhibit 14 and call your attention to the pictures 14-B, 14-C, 14-D, and 14-E, and ask you to compare the nature of the load upon the screen mesh members in that series of photographs.

A. With the air flowing in the same direction?

Q. The air is flowing from the top down, it has been stated. Take the lower picture in each photograph.

A. Well, the dust here is apparently shown by a lighter-colored photograph, lighter color in the photograph, and at the beginning it seems to be probably heavier, at the entering side. As you come down to those further runs——

Q. Will you name the picture you are looking at? [685]

A. All right. After you come down to 14-D, for



(Testimony of Frank B. Rowley.)

instance, the dust seems to be fairly well distributed between the entering side and the second leg of the Z.

And when you get down to 14-E, which is after five hours of run, it seems to be generally distributor, just a little heavier on the entering side, but it seems to be pretty well distributed through the middle leg of the Z, and also there is considerable dust shown on the leaving side of the filter.

Q. Do you find a heavy deposit on the second leg of the Z?

A. Yes, on the last photograph I do, building up.

\* \* \* \* \*

Q. Will you compare the nature of the loading in Exhibits 14-E and 9-E?

A. Well, in general I would say the loading in 9-E is more concentrated at the entering side of the filter than [686] it is in 14-E.

And in 14-E, the loading is more general through the filter.

One would represent to me face loading, heavy, and the other would be more of a general distribution of the load through the filter; that is, the 14-E has the more general distribution of the load through the filter than does the load of 9-E.

The Court: By the way, I wish to understand your testimony a little more clearly in connection with the assumption that both the Farr and the P-5 would be made of solid material and not screen, and that air entering in the P-5 filter can come in

(Testimony of Frank B. Rowley.)

one and can go out six. I understand this Exhibit PP here to be a cast between the screens and that the ridges here show the nature and the direction of the flow of air.

The Witness: And the possibility of it, that is right.

The Court: I have taken one entrance here and marked it, one side of it, with a red pencil, and I have taken the same and marked the other side of it with a red pencil, and they both come out one, there is only one hole for them to come out, isn't there?

The Witness: Your Honor, I could show you here, taking two crimps, where they come together.

The Court: Let us take the one I have marked with the red pencil. [687]

The Witness: All right. Take the one at the top, which is marked with a red pencil?

The Court: Yes. If I understand you correctly, now, that is the only way that air could flow if the screen material were solid.

The Witness: That is one way, that is right, assuming it is a solid material.

The Court: If it were solid, it could not get over into the other one.

Mr. Baldwin: The question was whether that was the only way it could flow.

The Court: If it were solid.

The Witness: If it were solid, that is not the only way it could flow or enter into this cell, that air which is passing along this opening, which is

(Testimony of Frank B. Rowley.)

solid, for some of it can go down into this opening (indicating).

The Court: Down into this opening? Let us follow that with the red pencil, and they both come out at the same opening.

The Witness: But when this gets in here (indicating), it can go across to that (indicating).

The Court: But it can't go across there if the material is solid.

The Witness: But this is opened material. This represents not solid material but air space. [688]

The Court: I can see what you mean, these represent air spaces, and the grooves here represent solid material?

The Witness: It can come here (indicating). This space is connected right across to this one (indicating), it can go in there and then down here (indicating) and go in that direction.

The Court: Wait a minute.

Mr. Baldwin: The metal was air, Your Honor.

The Witness: Every time it meets one of those, it splits.

The Court: Every time it meets one of them on the other side?

The Witness: That is right. And it can split and go in the other direction.

The Court: Well, I will play with it a while. Maybe I can understand it.

By Mr. Baldwin:

Q. Professor Rowley, you have stated that you understand the construction of the Niestle Patent

(Testimony of Frank B. Rowley.)

No. 739,956, is that correct?      A.    Yes. [689]

\* \* \* \* \*

Mr. Leonard S. Lyon: May it please the Court, regarding the stipulation that was tendered by counsel at the close of the session yesterday afternoon and which appears at the bottom of page 692 of the transcript:

“Mr. Baldwin: Your Honor, I think I can stipulate the we will not contend that there is anything wrong with Professor Duncan’s apparatus or the way he operates it; that if all conditions are the same, Professor Duncan can get an accurate result the same as Professor Rowley could.”

Of course as to the first part of the stipulation, we are willing to accept that, but if it is conditioned on the second part of the stipulation we cannot because our client feels that it has perfected the technique, the test technique, and is thereby able to get reproducible and more accurate results than could be gotten with the older technique without those perfections and developments. [697]

The Court: Do you accept the stipulation as modified?

Mr. Baldwin: Yes.

\* \* \* \* \*

By Mr. Baldwin:

Q. I hand you Defendants’ Exhibit PP and a piece of metal marked for identification Defendants’ Exhibit QQ-1, and ask you if you can state the relationship between these.

A. Exhibit QQ-1 is a piece of metal cut out of

(Testimony of Frank B. Rowley.)

Exhibit PP and is cut out along one of the corrugation lines, looking at it from either side, and it is cut out in such a way as to follow the ridge of that corrugation throughout the section.

In other words, it is one of those corrugations on one side.

Q. Now I hand you two pieces of corrugated plastic marked for identification QQ-2 and QQ-3, and ask if you will place those in their proper position to illustrate QQ-1

A. Take the section Exhibit QQ-1 and place it so that the ridge corresponding to the corrugation——

Q. The Z-form corrugation?

A. The Z-form corrugation. It fits into the Z-form corrugation.

The Court: Between 2 and 3?

Mr. Baldwin: The green one is QQ-3, your Honor.

The Witness: Into the corrugation of QQ-3, and then I will place the plastic Exhibit QQ-2 in its correct relation to the Exhibit QQ-3 in so far as its relation would be in the filter if the plastic represented screen elements of the filter in that position.

It will be noted that on the one side the line of the metal section follows directly through a corrugation, while on the other side the metal section shows the crossing paths on the opposite side of the filter, or shows where the paths [699] on one side join the paths on the other.

(Testimony of Frank B. Rowley.)

The Court: Let me see it.

(The exhibit referred to was passed to the Court.)

By Mr. Baldwin:

Q. Now the one trough of corrugation on the green side, or QQ-3, crosses how many troughs on the red side or QQ-2?

A. It actually crosses five between the filter and two, one on each edge, which is five troughs across within the filter, and then there is a trough or entrance in the leaving side, both. [700]

Q. Will you please re-examine the exhibit and see if some of the five you have counted are not in the same trough, in other words, how many different troughs on the red side, on QQ-2, are involved?

A. Well, there are two of those near the top and two on the bottom which are the same trough, that cross in and out. I counted each crossing of roughs.

Q. So, how many different troughs are involved on the red side of QQ-2?

A. On the different troughs, there are three.

Q. And in each of those places is there free air communication between the troughs or corrugations of one screen and the troughs or corrugations of the facing screen?      A. Yes, there is.

Q. Put this down here.

Now, will you take QQ-1 and explain the answer to a question asked you yesterday afternoon, following down one corrugation as the line of direc-

(Testimony of Frank B. Rowley.)

tion of one screen, will you state the nature of the air passageway between the two screens as you follow through the filter panel from one face to the other?

A. Well, the passageway is in cross-sectional area. As you start out with a triangular section near the entrance side, it runs into sort of a triangle and a rectangular section where it is enlarged. Then it comes down again to [701] a triangular section where it is making a bend, where it comes across the trough the second time, and it alternates down between the larger sections which are made up really of two triangular sections, at right angles to each other, and the smaller sections which are triangular. It follows in cross-section from one section to the other alternately through the paths from the front to the rear of the filter.

The Court: Does that make any difference in the effectiveness of this filter?

The Witness: Well, it does to this extent, your Honor: These larger cross-sections are the air streams which would be entering from another angle, from the other side of the filter, and wherever one of those enlargements is, the two streams of air are coming together at a diagonal, and that coming together creates a turbulence in the filter, or a rolling action.

The Court: Naturally, they are not two separate streams, are they?

The Witness: Well, we are assuming that these screens now have been plugged up with dust in

(Testimony of Frank B. Rowley.)

operation. When the filter is first put into operation and all the screens open, then the air is going both through the screens and through the channels substantially the same way. But after these screen members——

The Court: Substantially the same way in both devices? [702]

The Witness: Well, both from front to back, through the screens.

The Court: Yes.

The Witness: Now, after the screen meshes become plugged, assuming that they were completely plugged, then the air would pass through a single channel in the Farr filter.

The Court: What difference does that make on this filter, if it is plugged up?

The Witness: They are plugged up to the extent where air can't pass through, and yet they may have some efficiency in the collection of dust. I think it is a fundamental difference, in the way the filters load and in the way they operate.

The Court: For all commercial and practical purposes, when the filter falls below 70 per cent efficiency, it means that it is dirty and should be cleaned, is that right, or isn't it?

The Witness: Well, you might set it there or you might set it lower. Sometimes people will take the lower efficiencies and take out the heavy dust, or something like that, and in other cases they might want to take them out and change them even when they are down to 90, so you can't set any



(Testimony of Frank B. Rowley.)

particular place, but it is a question of loading the filter.

If the filter is loaded when all the screens are plugged [703] up, there still may be some chance of filtering. And furthermore, as a part of the screen is plugged up, then this rolling action takes place and you get that turbulence.

In the Farr filter in the catalog, they show that as the air impinges on the entering side of the tube, the channel, it fills the interstices or meshes of the screen on the impinging side and gradually turns that air stream down the tube, the channel.

Now, in the Air-Maze filter, it doesn't do that, because the air stream is separated immediately into two channels, and, as they are filled up, those two air streams will be separate and spread by the filters, spread over the full filter area regardless of whether the meshes were filled with dirt or not. By Mr. Baldwin:

Q. Do you find in the Air-Maze P-5 any single pathway through the filter of uniform cross-section?

A. No, not between the screen members, you mean.

Q. Is the principle which you have just been trying to explain, about the division of the air stream in the Air-Maze P-5 filter independently of flow through the screens, represented accurately in Defendants' Exhibit J, in your opinion?

A. Yes; it is the same principle.

Q. I hand you Plaintiff's Exhibit No. 13. [704]

The Court: That is when it is clean?

(Testimony of Frank B. Rowley.)

The Witness: No. When it is dirty, your Honor, actually. When it is clean——

The Court: But when it is dirty, this is the way it flows?

The Witness: But when it gets more and more dirty, then it begins to separate. I think that we have to assume, in any filter, when it is clean there is a large amount of air going through the screens. By Mr. Baldwin:

Q. I hand you Plaintiff's Exhibit No. 13, which is the comparative test by Professor Duncan of the Farr filter and the Air-Maze P-5 filter, and call your attention to the resistance curves which are substantially identical for the first 400 grams of load and thereafter the curve as to the Air-Maze P-5 rises more rapidly than the curve of the Farr air filter. Have you an opinion as to why that difference occurs? A. Yes.

Q. Would you explain your opinion?

A. I think that, as these filters were loaded with dirt, they gradually filled the screen meshes on the entering side. Then they begin to take on this action which I have just described, due to the flow of the air through the channels that are formed by the corrugations. [705]

And in the Farr filter, when those meshes on the entering side are filled, the stream of air is directed down a single channel, for each one of the separate channels, in a definite direction.

Now, in the Air-Maze filter, regardless of whether those are filled or not, you have that rolling action,

(Testimony of Frank B. Rowley.)

mixing action, which agitates the air stream and gives you turbulence all through the filter, and that turbulence does require some pressure drop upon the turbulence. It takes energy. And that pressure drop is illustrated, in my opinion, by the difference in pressure drop between the two filters under the same test conditions. [706]

The Court: On this Exhibit 14-E, the photograph of the P-5 filter, the testimony was that the air was introduced at the side which is shown here at the top.

The Witness: Yes.

The Court: All those accumulations are on one side of those ridges down to the exit side, and then they appear to take a reverse and get on the other side.

The Witness: Well, those accumulations are due to the——

The Court: Just a moment. That is not correct. Both in 14-D and 14-E, the first zig in the Z, the accumulation appears to be on the right side, that is, the right side of the photograph.

The Witness: Yes.

The Court: Then on the next zig of the zag it is on the left side and the exit is again on the same side as the entering side.

What would that indicate?

The Witness: Well, that indicates that there is a considerable amount of the air flowing straight through the filter and the meshes haven't been plugged up completely, and of course it is a flow

(Testimony of Frank B. Rowley.)

through the meshes, and that would collect the dust on the entering side more than it would on the exit side of the screens. But I think as it gets further into the filter it shows more collection on there, and if there had been more tests for a longer period it probably [707] would have plugged up some of those meshes and would have had a different action in the loading throughout the filter.

I think this shows that the loading through this Air-Maze filter is beginning to get fairly uniform. It doesn't——

By Mr. Baldwin:

Q. Professor Rowley, does not the dust collect on whichever side of the crimp is inclined against the stream of air?

A. Yes, that is in general true. It is the side that is struck by the dust which would collect the dust.

Q. And if in one layer in the Air-Maze P-5 the dust collection was on the right-hand side of the crimp in one of the photographs of Plaintiff's Exhibit 14, where would the collection be on the next adjacent screen which criss-crosses?

A. Well, if it was separated as these appear to be, and we are looking at the section of the filter, one being the bottom of the filter and the other the top, then it would naturally be on the opposite side.

Q. Looking at Exhibit 14-E, what is the relationship when the filter is put together of the upper and lower screens photographed there?

(Testimony of Frank B. Rowley.)

A. Well, I am not sure how they turned this, but if it were just cut and turned back, then the lower screen would be really folded up and put onto the upper screen.

Q. And the Z form of crimp which appears in both the [708] upper and lower portion of Exhibit 14-E appear to extend in the same direction when the filter is put together. How would they extend?

A. They would be in the opposite direction when assembled.

The Court: In other words, if this on top were laid on the bottom that would be the construction of your patent?

The Witness: Assume that that was cut open and laid out there.

The Court: They both run the same way here and it would run opposite.

The Clerk: Exhibit RR marked for identification.

(The article referred to was marked Defendants' Exhibit RR for identification.)

By Mr. Baldwin:

Q. I hand you some pieces of plastic marked for identification Defendants' Exhibit RR and ask you if you will identify it and explain it, if you can.

A. This is a small model which I made up last night in an attempt to show the direction of flow through the Air-Maze P-5 filter, what may happen to a stream of air entering the filter.

Q. You mean independently of opening in the screen?

(Testimony of Frank B. Rowley.)

A. Independently of openings in the screen.

The Court: That is assuming that the screen was an [709] impervious material?

The Witness: That is correct.

Now it was made up of two plastic corrugated sheets and put together so that the opening at the top, as I hold it here, represents the entrance, or may represent the entrance of air into the filter.

Now if a stream of air enters the filter in one of these openings coming down between the two corrugations, it will be noted that one side runs in one direction and the corrugation of the other plastic runs in the other, so that the stream of air first splits and goes, part of it, in each direction.

Then as the stream of air comes over the ridge on the other corrugation on the other side, or in other words wherever two of these red lines cross on on each side, there the air is able to pass across to either side of the filter. That is, there is a connection clear through both corrugations, and it may pass down one of two channels at each crossing, and that air which enters in one place at the top of the filter, one opening, may separate and leave in at least six openings at the bottom.

The Court: Six?

The Witness: Into those six tubes.

The Court: Five, is it not?

The Witness: Pardon me. Maybe I miscounted it. [710]

The Court: 1, 2, 3, 4, 5.

The Witness: Well, at any rate it depends on

(Testimony of Frank B. Rowley.)

how long it separates and goes through those openings and branches out as it goes on through the filter. That was to illustrate the spreading out laterally in the filter.

The Court: Very well.

The Clerk: Exhibit SS for identification.

(The article referred to was marked Defendants' Exhibit SS for identification.)

By Mr. Baldwin:

Q. I hand you a model marked for identification Defendants' Exhibit SS and ask if you will describe it and explain what it illustrates, if you can.

A. This model SS is made up of two plastic corrugated sheets which represent the corrugated mesh material used in the Air-Maze P-5 without corrugations, a solid material, and——

The Court: Without corrugations?

The Witness: With the corrugations but there is no mesh.

The Court: Impervious.

The Witness: An impervious material; that is correct.

And then it shows a series of colored strings entering one side and passing down through, or through between those two corrugated plastic sheets in channels which I think might take, or which air might take, in passing through the filter, [711] that is, showing that we might start in one place and spread out.

In this case there are eight strings passing

(Testimony of Frank B. Rowley.)

through but, as a matter of fact, every time a corrugation on one side crosses a corrugation on the other there is a connection between and you could travel from one side to the other right through those corrugations so far as the opening is concerned.

By Mr. Baldwin:

Q. Will you state whether or not those strings pass through openings that are just substantially the size of the piece of string or whether the openings are larger?

A. They are large openings, at least the triangular openings illustrated in the metal sample I showed.

The Court: Let me see it.

(The article referred to was passed to the Court.)

Mr. Baldwin: Will you mark this, please?

The Clerk: TT.

(The article referred to was marked Defendants' Exhibit TT for identification.)

By Mr. Baldwin:

Q. I show you a model marked for identification Defendants' Exhibit TT and ask you to describe what it explains or what it represents.

A. This is a plastic model built up of two corrugated [712] plastic discs, which are impervious, and corrugation is in the Z form as in the P-5 Air-Maze patent, and it represents by strings,



(Testimony of Frank B. Rowley.)

two strings, one red and one white, passages which are open to the model.

The Court: From end to end?

The Witness: The red string is from end to end and the white one from one side up and then back down.

By Mr. Baldwin:

Q. Professor Rowley, state whether or not in your opinion Defendants' Exhibit TT for identification illustrates whether or not the screen mesh members of the Air-Maze P-5 filter divide the space between adjacent screen layers in a lateral direction.

A. It shows that they do not divide it in a lateral direction.

The Clerk: Exhibit UU marked for identification.

(The article referred to was marked Defendants' Exhibit UU for identification.)

By Mr. Baldwin:

Q. I hand you a model marked for identification Defendants' Exhibit UU and ask you to explain what it illustrates, if you can.

A. This is a plastic model which is built up of alternate plain and corrugated sheets, the corrugations representing the corrugated mesh screen used in the Farr patent [713] and represents the openings which are formed by the screens from entrance to exit in the Farr construction. And in this model there are seven different colored strings that run through the channels or tubes which run from one

(Testimony of Frank B. Rowley.)

side of the filter to the other and shows that there is no connection between those tubes where there is no mesh in the screen but solid material.

Q. In the imperforate model, Defendants' Exhibit UU for identification, is there more than one opening through the model which any one of those strings could traverse?

A. When the string starts in one channel it must go through that channel. It can't go from one to the other within the filter model.

Q. Professor Rowley, when we discussed Defendants' Exhibit LL, which is the 7 x 7 panel constructed according to the Niestle (French) patent, at the close of your testimony regarding your test data as shown on Defendants' Exhibit—

The Court: Pardon me. Did you make up the model of this without the flat layer in between showing the Farr device, the crimps superimposed on one another directly?

The Witness: I didn't, your Honor, but if they were meshed as shown in the patent it would be the same thing, if the crimps were meshed one with the other.

The Court: I understood that in the Farr patent these [714] do not lie like this, they lie opposite, so that one layer crimps to the right and left and the other one would go from left to right, the elbow crimp.

Where is that model?

The Clerk: Exhibit 3?

(Testimony of Frank B. Rowley.)

(The exhibit referred to was passed to the Court.) [715]

The Court: They all lie the same, don't they?

The Witness: Yes, that is correct.

The Court: All right. Proceed.

By Mr. Baldwin:

Q. Professor Rowley, I call your attention to Fig. 4 of the Farr patent in suit and ask you to say whether or not the herringbone crimps turn in opposite directions or all in the same direction.

A. They turn in the same direction.

Q. Is there any teaching in the Farr patent in suit of turning the herringbone crimps in opposite directions? A. Not that I am aware of, no.

Q. Is there any teaching in the Farr patent in suit, so far as you know, of leaving out the flat screen member 9? A. No.

Q. Professor Rowley, at the close of your testimony regarding Defendants' Exhibit LL, the 7 by 7 filter constructed according to the French patent to Niestle, after you had submitted your data which is shown on Defendants' Exhibit MM, as related to your test of that Exhibit LL, I asked you whether or not in your opinion, based on your consultation work, you would know what modification to make in Exhibit LL to produce a lower resistance. My recollection of the record is that you answered "Yes" to that question.

A. That is correct. [716]

Q. Is that your present opinion? A. Yes.

(Testimony of Frank B. Rowley.)

\* \* \* \* \*

Q. You stated, in part of my examination previously, that you had consulted with filter manufacturers in the development and modification of specific filters, is that correct?      A. Yes.

Q. Did you ever consult with a manufacturer on the problem of reducing the resistance through a specific filter?      A. Yes.

The Court: The Niestle filter? Did you ever consult with him about a filter on that?

The Witness: No, not Niestle.

By Mr. Baldwin:

Q. Would you state the nature of the filter on which you were consulted? [718]

\* \* \* \* \*

A. It was a viscous filter, a type of filter manufactured by the Owens-Illinois Glass Company, now the Owens-Corning.

The Court: Viscous?

The Witness: They call them viscous type. It is fibrous.

By Mr. Baldwin:

Q. You mean impingement type?

A. Impingement type. We sometimes call them a viscous type instead of impingement.

The Court: The impingement type made out of fibrous glass?

The Witness: Fiberglass, that is right.

The Court: When was that? [719]

The Witness: That was about—prior to 1937.

\* \* \* \* \*

(Testimony of Frank B. Rowley.)

By Mr. Baldwin:

Q. I hand you Defendants' Exhibit NN (handing exhibit to the witness).

The Court: We only have one copy of that.

Mr. Baldwin: Yes, sir.

Q. (Continuing) And ask you whether or not any of the data and reports in that exhibit relate to the Arco filter which you have testified was constructed according to the Kaiser and Manning patents. A. Yes.

The Court: He testified to that yesterday.

Mr. Baldwin: Yes, he did.

Q. Would you call attention to where that Arco filter and records or data appear in this bulletin, Exhibit NN?

A. Well, there are several places where the Arco filter is referred to.

Q. I would like you to confine your answer to where the [721] efficiency is reported.

A. (The witness examines said exhibit.) It is, I would say, on page 5, Fig, 4, in one place, where it is reported in curves. [722]

\* \* \* \* \*

Q. I call your attention to table 3 at the bottom of page 3. Is this Arco filter mentioned there?

A. Yes.

Q. Insofar as efficiency or arrestance is concerned? A. Yes, it is.

\* \* \* \* \*

Q. Would you read the arrestance figures of the Arco filter if they appear on table 3?

(Testimony of Frank B. Rowley.)

A. The arrestance figures in percentage run from 77.7 for Pocahontas ash, one type, 84.9, 81.6, and 83.3 for Illinois fly ash.

The Court: For what?

The Witness: Illinois fly ash.

The Court: Illinois fly ash? [723]

The Witness: Illinois fly ash. Illinois coal fly ash.

The Court: That is a new one to me. That is the first time I have heard of that.

The Witness: We designate the different fly ashes by coal. We call it Illinois coal fly ash.

By Mr. Baldwin:

Q. I call your attention to Fig. 8 on page 7 and ask you if you find there anything relating to the resistance of the Arco filter.

A. Yes. There are resistance curves here for different types of carbon dust when used in the filter.

Q. What does it show to be the resistance of the filter when clean?

A. It is .15 inches.

Q. I believe you stated previously, but will you repeat, how the Arco or Detroit type air filter, which you have testified it was, is designated in this bulletin?      A. As filter C. [724]

Q. Have you ever known of filter panels to be placed in series in the use of filters?

A. Yes.

Q. Where and when did you know of such an arrangement?

(Testimony of Frank B. Rowley.)

A. Well, they have been used in filter installations at least since 1934 and they are so shown. I have tested them myself in tandem as early as 1934.

Q. You have tested them?

A. Yes. And they are shown in the ASH and VE 1934 guide as installed in tandem.

Q. Professor Rowley, have you ever tested the same filter with a dust free of lint and with a dust containing lint?      A. Yes.

Q. Would you state the effect on test results when the test dust includes lint or is free of lint?

A. Of course it depends on the type of lint and how much, but the general results are that if there is lint in the dust it will plug up the filter faster and the resistance will increase more rapidly. The life of the filter will be reduced by the use of lint in the dust.

Mr. Baldwin: That is all. You may cross examine. [725]

\* \* \* \* \*

Mr. Baldwin: If the Court please, I would like at this time to offer in evidence Defendants' Exhibits PP, QQ, RR, SS, TT, and UU. They are all those models.

The Court: Admitted in evidence.

(The articles referred to were received in evidence and marked Defendants' Exhibits PP, QQ, RR, SS, TT and UU respectively.)

Mr. Harris: At this time, Your Honor, I would also like to offer Defendants' Exhibit A, which

(Testimony of Frank B. Rowley.)

is the P-5 obsolete model, Defendants' Exhibit D, which is the Farr round filter, Defendants' Exhibit E, which is the Farr bulletin 100-1, Defendants' Exhibit F, which is the Farr bulletin 100-4, Defendants' Exhibit G, which is the 7 x 7 Farr specimen, Defendants' Exhibit H, which is the Farr bulletin F-161, Defendants' Exhibit I, which are the two plastic strips with the red and green strips, Defendants' Exhibit J, which is the sketch that has been referred to.

The Court: Admitted.

(The articles referred to were marked Defendants' Exhibits A, D, E, F, G, H, I and J respectively and received in evidence.)

[Printer's Note: Defendant's Exhibits E and J are reproduced in Book of Exhibits.]

Mr. Harris: Also, Your Honor, Defendants' Exhibit V, Defendants' Exhibits V and W, which are these brass screen wire specimens.

The Court: On the St. Cyr patent?

Mr. Harris: On the St. Cyr patent. [726]

The Court: Admitted.

(The specimens referred to were received in evidence and marked Defendants' Exhibits V and W respectively.)

Mr. Harris: Also Defendants' Exhibit Z, which is a diagram of the Row (British) patent Fig. 2.

The Court: What is that again?



(Testimony of Frank B. Rowley.)

Mr. Harris: It is a diagram of the Row (British) patent Fig. 2.

The Clerk: Exhibit Z is a figure shown in the Farr catalog illustration and the Row (British) Fig. No. 2.

The Court: I do not seem to have Z marked down here.

Mr. Leonard S. Lyon: I don't think there is any foundation for Z. I would like to see it to be sure what Z is.

(The exhibit referred to was passed to counsel.)

Mr. Leonard S. Lyon: I think the questions were excluded on that.

Mr. Harris: No, this is the one that Mr. Russell identified of the sketch.

The Court: Very well. Admitted.

(The illustration referred to was received in evidence and marked Defendants' Exhibit Z.) [727]

[Printer's Note: Defendants' Exhibit Z is reproduction in Book of Exhibits.]

\* \* \* \* \*

### Cross Examination

By Mr. Leonard S. Lyon:

Q. Dr. Rowley, in your opinion can the curves produced by the test method described by Mr. Duncan and recorded as he has recorded them on

(Testimony of Frank B. Rowley.)

the exhibits in this case, be correlated with the curves which you have produced following the test methods that you used and recorded in the manner that you have recorded them in the exhibits you have produced here?

A. You mean they can be correlated in the understanding from the test result? Yes, I think they are not the same of course because Mr. Duncan used a different velocity than I did. However, you can convert from one velocity to the other velocity by well-known methods. And Mr. Duncan used, I understand, a different method in sampling his air upstream and downstream than I did, but I don't think it is material so long as both were the same.

Now the thing that I think is difficult to correlate between those tests is the fact that Mr. Duncan didn't use the same test dust. He used Arizona dust.

Q. One factor that has to be considered in correlating these curves is the fact that they are drawn on different graph paper, is that not correct?

A. No, that doesn't make any difference. You just [728] convert your scales when you correlate.

Q. Well, that would affect the shape of the curve, would it not?

A. Not necessarily. It depends on what scale you use. You can affect the shape of the curve by selecting different scale on any graph paper.

Q. You used a different scale than Mr. Duncan did? A. Yes.

(Testimony of Frank B. Rowley.)

The Court: It would affect the appearance shape of the curve.

The Witness: Yes, but you take that all into consideration when you are correlating it.

By Mr. Leonard S. Lyon: [729]

\* \* \* \* \*

Q. In comparing these sheets of test data, the curves on these sheets of test data, one significant thing we have all agreed to is the filter efficiency curve, is that correct?

A. The filter efficiency or arrestance is important.

Q. They are the same thing? [730]

A. They are the same thing; different terms.

Q. And the pressure drop is significant?

A. That is correct.

Q. And the filter rate is significant, the flow rate?

A. The flow rate of air through the filter, yes.

Q. And the loading rate or loading capacity, is that significant?

A. The rate of dust feed, yes.

Q. Well, the loading capacity of the filter, the total loading capacity, is that significant?

A. The load capacity is a result. It isn't something you can determine ahead of time when you are setting up the test. It is the result you get from the test values.

Q. But that result is significant?

A. Yes, that is correct.

(Testimony of Frank B. Rowley.)

Q. Now how do you determine the loading capacity?

A. You measure the amount of dust which you feed into the airstream leading to the filter and then you know the amount of dust fed over the hour period or period of the test. Then you measure the amount of dust in the aid leaving the filter.

Now you subtract the amount of dust in the air leaving the filter from that which enters and that gives you the amount held by the filter. [731]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. How do you determine when a filter of the impingement type has reached its total dust load capacity?

A. You have to determine, before you start to test, some criteria for that, and one method for the pressure rise—now, you can take either the pressure rise across the filter, the rate, and say that you are going to determine the maximum capacity when that pressure rise has reached a given pressure such as half an inch, or you can take a particular efficiency. When the efficiency drops below a certain level, you can say that that is the capacity of the filter. It depends upon your selection of the limits, and they are both used.

Q. They are both? Either one is arbitrary?

A. Yes. You can select the dust-holding capacity as the amount of dust the filter would hold up to a rise, we will say, of half an inch, or you could go to one inch, it is an arbitrary matter as to

(Testimony of Frank B. Rowley.)

where you select it, but that doesn't change the test method. That is merely procedure.

Q. Now, discussing the variables that enter into these tests, what is the nature of the change in the filter efficiency curve that is made by varying the flow rate, the [734] flow rate through the filter?

A. That depends on several things. It isn't the same for all filters. The flow rate may change the filter efficiency in either direction. That is, you may have a flow rate of 300 feet per minute, we will say, and you might go up to 1,000 feet a minute on a certain filter. You might increase the rate of efficiency percentage or you might decrease it. There is no law that holds for all filters. There is a different action takes place.

Q. What is the nature of the change in the pressure drop curve that is effected by a change in the flow rate?

A. For a given filtering condition, if you load your filter up to a certain condition and take the pressure drop and differ the velocities at that particular setting or loading, the pressure drops varies about as the square of the velocity, it is a little less than the square on these filters, we found it to be 1.7.

Q. Have you ever conducted any experiments, using the type of dust that Mr. Duncan testified he used at the Farr Company, in your testing?

A. No.

Q. Have you any opinion as to what effect, if

(Testimony of Frank B. Rowley.)

any, that would have on either the efficiency curve or the pressure drop curve?

A. I have an opinion of what effect it would have on [735] the pressure drop curve, yes.

Q. What is your opinion?

A. My opinion is that that would flatten out the pressure drop curve and give us loading with less pressure drop.

Q. Why?

A. On account of the fact I have tested, rated filters with different densities of dust and I find that the pressure drop decreases as the density of the dust increases.

Q. To what extent do you think it would flatten the pressure drop curve?

A. I think it would have a very material difference in it.

Q. Well, can you tell us in what order it would be, in inches of water?

A. I can't tell you in inches of water, because there are factors that enter there, the type of dust and many things enter. I know it would, I know in my opinion that it would materially change that drop in resistance.

Q. Now, what if any tests have you made on the Farr filter, respecting those on which you have brought in the exhibits?

A. To substantiate that, I checked the Farr filter in two or three tests, to determine the effect of different oiling on the filter. I took S.A.E. 30

(Testimony of Frank B. Rowley.)

oil instead of S.A.E. 40, and that gave a little lower efficiency than the [736] S.A.E. 40.

Then I checked two or three runs to determine whether that high efficiency at the start was characteristic of the filter or not, and in those two or three runs it did appear to be.

Q. Were all of those tests made for the purpose of this case?

A. Yes, all of mine. I tested all of those. The Farr filter I didn't test before this case.

Q. When did you first see a Farr filter?

A. I do not remember. I have known of the Farr filter for some time. I can't say when I first saw one.

Q. But you never made any tests on it until you made those that you made for the purpose of this case?

A. No. That is correct.

The Court: Going back to this matter of difference in dust, you said by using the dust used by Professor Duncan the pressure drop would be less?

The Witness: That the increase would be less, that is right, as you built up dust in the filter.

The Court: Well, in your own graphs here, graph JJ or in any one of them, it is your opinion, as I understand it, if I understand it correctly, that if the Duncan dust were used, this lower graph, instead of being up on JJ to about .15, would be lower? [737]

(Testimony of Frank B. Rowley.)

The Witness: Yes, it would be lower, that is right.

The Court: Why, because the dust is finer?

The Witness: It is heavier dust, and it is the volume that fills the filter.

The Court: It is a heavier dust?

The Witness: It is a higher-density dust, more dense.

The Court: Well, is it more comparable to the dust that is in the air?

The Witness: No, sir.

The Court: To be filtered?

The Witness: In my opinion, it is not. It is less comparable.

The Court: It is less comparable than Pocahontas?

The Witness: This Pocahontas ash and carbon has been used and a lot of work has been done on it, and that so far has been the best one that has been devised, that has been acceptable.

The Court: Well, Pocahontas dust, that is carbon and lampblack?

The Witness: Carbon black, lampblack.

The Court: And Pocahontas dust is not the dust that you find out here on the road, is it?

The Witness: No, it is not a road dust, exactly. The road dust is usually very heavy. This road dust you find around the city, and there is not too much matter of that [738] dust in the air.

The Court: There isn't too much of that dust in the air?



(Testimony of Frank B. Rowley.)

The Witness: Not in the filtered air. That is a heavy dust. That is a heavy-type dust.

The Court: I suppose you have windstorms up in your country?

The Witness: That is right.

The Court: In the summer time, and it blows dust. That is not Pocahontas dust, is it?

The Witness: No, sir.

The Court: That is just dirt?

The Witness: Yes.

The Court: Now, if that kind of dust were used in your tests would these lines be any different?

The Witness: It would depend on the density of that dust and the characteristics of it.

The Court: Have you ever conducted a test with just plain old dust?

The Witness: No; not of that type that you mention.

The Court: Well, do I understand you to say that there is less of that type of dust in the air, where filters are used, that is, in and about the cities and say on the coast here and in the desert countries and in the farming areas, than there is of Pocahontas ash?

The Witness: No. I wouldn't want to say that, because [739] you haven't much Pocahontas ash around here. It is that that dust, Pocahontas ash and carbon black, is accepted as the type of dust that is representative of dust in average air, and the point is that—— [740]

The Court: Well, that is mostly found in in-

(Testimony of Frank B. Rowley.)

dustrial sections, where they burn coal, is it not?

The Witness: Well, the carbon is found where they burn oil and coal.

The Court: Coal or oil?

The Witness: Most any district has some carbon black in it. But in comparing filters you have to select some kind of dust, otherwise you have results that wouldn't mean anything. You have to have some kind of dust that is uniform.

The Court: In other words, you have conducted your tests with a type of dust which you used because you believe that provides a better result, that is to say, it is more comparable to the——

The Witness: Than the average dust.

The Court: ——more comparable to the conditions under which the filter would be put?

The Witness: Yes, that is correct.

By Mr. Leonard S. Lyon:

Q. On your Exhibit JJ, you show the pressure drop of the Farr filter when clean and the start of the test to be  $1\frac{1}{2}$  inch, is that correct?

A. No, .05.

The Court: Half of a tenth. [741]

By Mr. Leonard S. Lyon:

Q. On Exhibit 13 Mr. Duncan found the pressure drop of the Farr filter when clean to be  $1/10$ th of an inch, just about twice what you found it to be. Do you think that difference was due to the difference in the dust used in the test method?

A. No, that was due to the difference in air

(Testimony of Frank B. Rowley.)

velocity through the filter. There was no dust in the filter at that time.

Q. Due to the difference in air velocity through the filter? A. That is correct.

The Court: In other words, the greater the air velocity it creates more dust, is that it?

The Witness: It creates more pressure drop across the filter. He is referring to the difference——

The Court: I understand.

The Witness: No, the greater air velocity through the filter just simply creates a greater pressure drop across the filter.

By Mr. Leonard S. Lyon:

Q. What did you find the pressure drop to be in the Farr filter as shown on Exhibit JJ after the dust load on the filter had reached the maximum of 656 grams?

A. Do you want the filter resistance? Is that what [742] you asked for?

Q. Yes.

The Court: I thought he asked for the pressure drop.

The Witness: It is the same thing.

By Mr. Leonard S. Lyon:

Q. Pressure drop and filtered resistance mean the same thing, do they not?

A. Yes, they do. It is just a different way of expressing it.

The pressure drop at that point was .14.

The Court: Five hundred and what?

(Testimony of Frank B. Rowley.)

The Witness: No., .14.

The Court: He said when there were five hundred and something.

Mr. Leonard S. Lyon: 656.

The Witness: 656 he took as the end point of the curve, I think he is referring to.

The Court: On your Exhibit JJ?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. What did Mr. Duncan find the pressure drop to be at that point as reported on Exhibit 13?

A. He found it to be about .112, or something like that.

Q. Now what would you attribute those differences to? [743]

A. Well, a part of it, as I have said, the change from the beginning to that point, is due to the difference in dust. The fact that he is running at a higher velocity all the time would raise his curve at any time above the curve for my test.

Q. If you were asked——

A. Just a minute. Those two are different. The raise in velocity gives the higher drop, higher velocity, but the dust which he is using gives a lower pressure drop as the filter is loaded.

Q. If you were asked to correlate those two curves, the pressure drop curve on Exhibit 13 and the pressure drop curve on Exhibit JJ, what would you say to be the correct curve?

A. Well, by correlating them I would take the one curve, we will say on Exhibit 13, and replot

(Testimony of Frank B. Rowley.)

that on JJ, but I would correct for the velocity difference.

The Court: What would you do to correct it?

The Witness: I would take the same dust load on the filter and plot both curves at the different velocity. That is, I would take my dust load, we will say, on Exhibit JJ, the certain dust load on the filter which I take as 415, and if I was plotting Exhibit 13 on that I would take from Exhibit 13 the dust load on the filter, which would be between 400 and 500 on the horizontal line, 413, I would take [744] the pressure drop as shown there, which is a little above .1 and I would convert that over to the same velocity, that is, to have them on the same velocity.

The Court: How would you convert that to the same velocity?

The Witness: I would take the ratio of the two at .17, that is about 2 to 1.

The Court: You mean 300? Was that the velocity you used? [745]

The Witness: I used 300.

The Court: That would be 300 to 519?

The Witness: It means that if I took my value at 300 and then if I raised the velocity by that same loading to 500, my pressure drop would be just about twice as much. It comes out just about 2 to 1.

By Mr. Leonard S. Lyon:

Q. Is that in direct relationship between one pressure drop and the other?

(Testimony of Frank B. Rowley.)

A. I explained it is proportionate to the 1.7 power.

Q. Now you have shown on Exhibit JJ that the initial filter efficiency which you measured at the end of the second hour was 81.5, is that correct?

A. At the end of the second hour?

Q. Yes. A. Isn't that 80.4?

Q. It seems to be above 81. Where the curve starts, the filter efficiency.

A. Well, yes, the curve is 81.5.

Q. But your actual measurement that you obtained was 80.4? A. That is correct.

Q. Now Mr. Duncan shows on his Exhibit 13, with a dust load of 100 on the filter, that the Farr filter had an efficiency of 78. Do you notice that?

A. Yes.

Q. The nearest point that I can read for a dust load of 100 on your curve shows a measurement of 81, approximately. Do you agree with that?

A. You first said 78. That was 77 I believe on the chart.

Q. All right. I think you are right, 77.

A. Now what was the next part of the question?

Q. I think I can restate it.

What is the nearest measurement you have or value you have on your Exhibit JJ for the Farr filter, filter efficiency at a dust load of 100?

A. That is, you want the nearest on my curve for 100 on the Farr, not on my curve?

Q. On your curve.

(Testimony of Frank B. Rowley.)

A. I don't think I understand your question. You want the point on my curve which corresponds the closest to the 100 load on Mr. Duncan's curve, is that correct?

Q. Yes.

The Court: That would be at the end of three hours, would it not?

The Witness: No, you have to come over on my curve until we get 77 efficiency, the way he is asking the question. 77 efficiency on my curve would be——

Mr. Leonard S. Lyon: No, I am asking you, Doctor, for [747] the efficiency on your curve, Exhibit JJ, for a dust load of 100.

The Witness: For a dust load of 100 on my curve or Mr. Duncan's curve?

Mr. Leonard S. Lyon: On your curve.

The Witness: All right.

On my curve it would be around 81.

By Mr. Leonard S. Lyon:

Q. And that would lie on the curve midway between two points that you actually measured, would it not? A. Yes, that is correct.

Q. And what were the actual measurements on those two points?

A. The measurement on the first point at the end of two hours was 80.4 and the next point was 81 on the end of the third hour.

Q. And the next point after that was what?

A. The next point after that was for the fourth hour, was 80.

(Testimony of Frank B. Rowley.)

Q. What about that point I see up there at 82.6?

A. That evidently is not a point on the curve. The points for the curve are all on the lines. I don't know what that is.

Q. What was that point at 82.6?

A. I don't know what that was up there. [748]

The Court: I think you said yesterday that that is where you tested them, that dot.

The Witness: You are talking about the one at 82.6?

Mr. Leonard S. Lyon: That is right.

The Witness: But that is between 3 and 4. All my test points are directly on the lines that represent the hours.

By Mr. Leonard S. Lyon:

Q. If you had drawn the curve through the first three points that you measured, the curve would start at 80.4, go up to 81 and then go up to 82.6, would it not?

A. No, that 82.6 is not a point on this curve at all. I don't know what that is. My test points are all on the lines, the vertical lines, not between the lines.

Q. I am not asking which ones you drew the curves through, I am asking you which ones you actually measured. Did you make a measurement and obtain a value of 82.6?

A. No. I don't know what that is up there now. It is evidently a spot on the paper.

Q. You have got a point down here at 75.8



(Testimony of Frank B. Rowley.)

about dust fed in the amount of 201.5 grams. Was that a measurement?

A. That is a measurement. [749]

By Mr. Leonard S. Lyon:

Q. How do you know that is a measurement and 82.6 is not?

A. Well, my measurements are all on those vertical lines, shown on the main lines. I have no measurements that fall between those lines. I didn't take any between them.

Q. What happened in connection with this point of a dust feed of 20.5 which appears at 75.8 or so?

A. Well, I don't know. It may be that we did not get the complete sample. It might have been a leak past the crucible, something like that. Those are conditions that arise in testing and you cannot get every point to lie on a curve in a test.

Q. When you test and make these curves, do you just disregard those that you think you cannot use in the curve?

A. No. I put those points on to show exactly, when the tests were made, what the results are, and then I draw the curves, my interpretation of the data, but the data is there.

Q. What about the point in your curve above 361.6 dust load, that is up at 80, and you have a curve down at 77.8?

A. That is right.

Q. Did you get that measurement?

A. Taking an average through those curves, yes, that is a measurement up there. That is a test. [750]

(Testimony of Frank B. Rowley.)

The Court: What you get is taking an average through the curves?

The Witness: I take an average. You cannot run these filters at given points, in my estimation, to lie straight on the curves. My points fall on both sides of the curve, and I try to follow the curve.

By Mr. Leonard S. Lyon:

Q. When you get the value 80 that appears above 31.6 and get a value for the curve at that point of 77, what other measurement, average with the value of 80, gave you that point on the curve?

A. The other values, you will note, before that are below the curve. Three or four prior to that are below the curve and there are two or three that are above the curve, and I have drawn the curve as a representative curve through those points.

Q. Will you look at the slope of your curve from where it crosses the value of 78 to where it crosses the value of 76. Did you obtain any measurements below that curve to average with those above, to produce the slope of the curve that you have there?

A. No, sir. They are all above in that area, and they are below prior to that and after that. So, if someone wants to take those points and replot the curve, they are at liberty to do so. Those are the points I am basing it on. [751]

Q. This dust that you used in the testing from which these curves were made, you used lampblack as one ingredient, did you not?

(Testimony of Frank B. Rowley.)

A. Yes, carbon black.

Q. Carbon black. And don't you know that carbon black has a tendency to agglomerate in your tests?

A. Yes, I know that it agglomerates and also we mix it with other dusts.

Q. You have published your opinion or your findings that that is a difficulty you experience in these tests, have you not?

A. I don't remember that I have ever published it. It is a difficulty, of course, that we have, to get the dust thoroughly mixed with the air. That is the reason we agitate it.

Q. And carbon black has a propensity for agglomerating in the operation of these tests, and you have to be careful with it?

A. Well, it depends somewhat on the carbon black, how they make it, as to how much it will agglomerate.

The Court: When it agglomerates, it catches on the screen, so it is a bigger hunk of dust, is that what you mean?

By Mr. Leonard S. Lyon:

Q. It does not get uniformly dispersed, because it lumps up? [752]

A. Not if you mix it and screen it through the mesh. We mix the dust, and in order to get a thorough mix we screen it after it is mixed.

Q. If your dust agglomerates, what effect does it have on the test data?

A. If any dust agglomerates, it depends on how

(Testimony of Frank B. Rowley.)

much it will agglomerate. All fine dust will agglomerate. It is very difficult to keep it from doing so.

Q. In your testing, using your dusts that you have tested, as compared to the dust that the Farr Company uses, haven't you experienced the same type of thing that I have been calling your attention to on Exhibit JJ, that you have to try to draw a curve by some kind of an average of points that are quite far distant removed from the curve?

A. No. That has no relation to the difference in dust. I have not used the road dust or Arizona dust that Farr is using.

The Court: Now it is the Duncan dust.

The Witness: The Duncan dust.

By Mr. Leonard S. Lyon:

Q. As a matter of fact, it has been your experience, in your own testing work, that you have these points quite substantially removed from the curve, and they are not close to the curve you have actually drawn, you have to average them, is that correct? [753]

A. It is our experience, in testing any of this kind of apparatus and rating it, that you cannot get curves to fall right on the lines, and we plot our curves from the points which we get and we put the points down to show what data we have used in plotting the curves.

Q. Just one question on this point. We furnished you with the actual rating, measurements, that Mr. Duncan found and upon which he based his

(Testimony of Frank B. Rowley.)

curves. Did you examine those? A. Yes.

Q. Did you notice that the actual readings correspond very closely with the values on the curve that he drew? A. Yes, I did.

Q. Much closer than your work, isn't that correct? A. Yes. [754]

\* \* \* \* \*

Mr. Baldwin: It appears to the defendants that the procedure is developing into a battle of test procedures and we think that is immaterial to the issues in the case, and if it will hasten the trial at all we are willing to stipulate that the Farr Company has very fine test apparatus, that Professor Duncan gets accurate results with it, and that the Farr Company test procedure for the purposes of this action is the best in the world.

Mr. Leonard S. Lyon: I will accept the stipulation and I will try to shorten the case as much as I can in view of it. [755]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. I believe you testified that you thought the dust employed by the Farr Company in its testing procedures would give a lower pressure drop because that dust had a heavier density than the dust you employed in your test. Is that what you meant to say?

A. Well, it is a heavier density, yes. It is not a mixed dust, it is a single dust, but of a heavier density.

Q. Your knowledge of the density of the Farr

(Testimony of Frank B. Rowley.)

dust is confined to the figure that was given you by the plaintiff, to wit, a density of 2.5?

A. I don't have the density nor figures on the Farr dust, no.

Q. What did you think it was in expressing your opinion?

A. I don't know. I haven't worked with the dust. I don't know the density.

The Court: Excuse me, counsel.

I might say this in connection with these tests: I notice by Plaintiff's Exhibit 13 that both the Farr device and the Air-Maze device were tested under identical conditions with the identical dust. It does not seem to be the case with the test results—well, that is not correct.

The test results of the defendants were made under [757] identical conditions with identical dust, but I do not have before me any test results of the Farr device made by the plaintiffs under the defendants' dust or any of the defendants' tests made with the Duncan dust.

Mr. Harris: There are none.

The Court: I know there are none. But I have to decide this by weighing dust here.

By Mr. Leonard S. Lyon:

Q. What did you base your opinion on that the plaintiff's dust would give a lower pressure drop than the dust you employed if it was based on a comparison of their density and you didn't know what the density of the plaintiff's dust was?

A. Well, it is a dust, a single dust, it isn't a

(Testimony of Frank B. Rowley.)

mixed dust, for one thing. And then the density was given as 2.5, and I know it would be a jolted density from the figure. It would be heavier than the dust I used but I don't know what the jolted density is. I never tested it.

Q. Did you understand that that figure of 2.5 was the actual specific gravity of the dust and not a jolted density?

A. I knew that the jolted density wouldn't be up there. I didn't know what the 2.5 was. I thought it was a pretty high figure.

Q. Well, will you explain to the Court what is meant by a jolted density, if you know? [758]

A. A jolted density is the density of the mixed dust at maximum density when it is jolted.

You take the sample dust and put it in a container and then that is loose dust, and that density is lower than it is when you jolt it down. You jolt it until you get the smallest volume that that dust can contain.

The Court: You do not pack it?

The Witness: No, just jolt it.

The Court: You do not force it, you just jolt it?

The Witness: You jolt it and you will soon strike a maximum density, and that is what we call the jolted density.

By Mr. Leonard S. Lyon:

Q. Is the jolted density the same value as the specific gravity?

A. Well, the specific gravity—I think you are

(Testimony of Frank B. Rowley.)

confusing the terms there—the specific gravity is often called the jolted density, the same as the jolted density is called the specific gravity. The specific gravity is the weight per unit volume and of course the jolted density we give that in grams per cubic centimeter. [759]

By Mr. Leonard S. Lyon:

Q. Well, what do you understand is the specific gravity of the plaintiff's dust?

A. I don't know as I just understand what they did mean by that figure. It was much heavier than what I would suppose our dust—than I know our dust to be, but I don't know just exactly what they were. I think they should explain what they mean by it.

The Court: Have you ever seen any Duncan dust?

The Witness: I have seen it, but I have never worked with it. I have seen the dust.

By Mr. Leonard S. Lyon:

Q. Have you determined the specific gravity of the dust that you have employed?

A. Well, I have determined the jolted density, and that is what we use.

Q. Well, have you determined the specific gravity?

A. The specific gravity of the dust as a whole, yes, that is, the jolted density, that is the weight per unit volume, and that is specific gravity.

Q. How would you measure the specific gravity



(Testimony of Frank B. Rowley.)

of a dust such as we are talking about, to determine its actual specific gravity?

A. If I was determining the specific gravity, that is, the weight of the dust per unit volume, which is termed the [760] specific gravity, I would take a volume of that dust and measure that volume in a jolted density condition, and I would have the specific gravity in weight of the dust per unit volume.

Q. That would be actually what is known as the parent density of the dust, would it not?

A. No. We call that the jolted density of the dust.

Q. I am not interested in what you call these things. A. Well, that is the term.

Q. What I am trying to find out—there is a scientific method for determining specific gravity, isn't there?

A. It depends on whether you are talking about the specific gravity, about the dust volume, or whether you are talking about the specific gravity of the particles of which the dust is made.

Now, when you jolt the dust down, you have some of the air jolted out of it, and that is what we call the density of the dust.

Q. Would the opinion that you have expressed be any different if you knew that the figure 2.5 that was supplied by the plaintiff represented actual specific gravity as determined scientifically and not mere jolted density?

A. No, because I would be quite certain that

(Testimony of Frank B. Rowley.)

that dust was much heavier than what I used, even with that specific gravity. [761]

Q. Have you determined the specific gravity of the dust that you used? A. No, sir.

Q. Other than by the jolted density method?

A. No, sir, I haven't.

The Court: Well, what is the jolted density per unit volume of your dust?

The Witness: .55.

The Witness: .55.

The Witness: Yes.

The Court: That is the specific gravity?

The Witness: That is the specific gravity in terms of weight per unit volume. But, now, they are talking about the specific gravity of the dust without any air in it at all. There is always some air in that volume after jolting.

By Mr. Leonard S. Lyon:

Q. How would you determine the latter?

A. Well, you have to immerse it in water and get the water displacement of the solid particles.

Q. And do you know whether that figure would be the same as the figure that you gave for jolted density? A. No. It would not.

Q. It would not?

A. It would not be the same.

Q. Would it be greater or less? [762]

A. It would be greater, because the air is taken out on that determination.

The Court: When you say .55 per unit volume, what is the unit?

(Testimony of Frank B. Rowley.)

The Witness: Well, it is .55 gram per cubic centimeter.

The Court: Per cubic centimeter?

The Witness: Yes, that is right.

The Court: And that "per cubic centimeter" is unit volume?

The Witness: That is unit volume, and the specific gravity of water on that basis is 1, so ours is .55 of the weight of water per unit volume.

By Mr. Leonard S. Lyon:

Q. Have you examined or are you familiar with Plaintiff's Exhibit No. 4, the Air-Maze P-5 bulletin?

A. Well, I have seen it. I haven't examined it closely.

Mr. Leonard S. Lyon: May we have it, Mr. Clerk?

(The clerk hands document to the witness.)

By Mr. Leonard S. Lyon:

Q. Will you look at the first inside cover page, the paragraph at the bottom of the page in the first column, which starts out, "Because of its remarkable efficiency at high velocity." Do both Exhibit HH and Plaintiff's Exhibit 13 show that the Air-Maze P-5 filter involved in this case has high filtering efficiencies?

A. No. They are not high filtering efficiencies, not [763] in terms of dust taken out, no.

Q. Well, they both have approximately the same efficiency, do they not?

(Testimony of Frank B. Rowley.)

A. They both have substantially the same. They are a little different in the range throughout the test.

The Court: When you say that they do not have a high efficiency, of course "high" is a comparative term—high compared to what?

The Witness: Well, compared to the scale percentages. The high-efficiency filter, I would say, would be in the 90's or above, in arrestance. The efficiency based on dust taken out is only up to about 75.

The Court: 75 per cent or whatever it is?

The Witness: About three-quarters.

Now, in fact, in the efficiency of filtering air, it is much easier to take out that first dust, it doesn't take too much filter to take out 40 and 50 per cent, but as you go up in percentage it becomes very much harder, when you get into a rather high efficiency you experience that, when you get to 90.

The Court: Are you familiar with the commercial demand, that is to say, whether or not the commercial demand is for a filter which will go beyond the range of these two filters in efficiency?

The Witness: Some of the commercial demand. [764]

The Court: The ordinary commercial demand?

The Witness: Lots of it is, yes. Both ways. In some places the commercial demand doesn't require it and at other places it does require it. There are some places that require a very high

(Testimony of Frank B. Rowley.)

efficiency, and these filters wouldn't be adapted to it.

The Court: That is, by "adapted," you mean to the ordinary use such as of a food store or home?

The Witness: Yes, I think they would.

The Court: Or an ordinary commercial establishment?

The Witness: Yes.

The Court: Like a department store?

The Witness: Yes, I think they would.

The Court: Just like that?

The Witness: Yes.

The Court: Or a railroad car?

The Witness: Yes, in railroad cars. It depends on how they are used in railroad cars.

The Court: Well, I mean for the passengers.

The Witness: Yes.

The Court: Where they are.

The Witness: Yes.

The Court: In warehouses?

The Witness: Yes.

The Court: And generally? [765]

The Witness: In general.

The Court: The higher rate of efficiencies would be for some special purpose, such as filtering out all of the dust particles in connection with some explosive medium, such as gasoline, Diesel fuel, or some other, or at a hospital?

The Witness: I wouldn't go clear to that range for high efficiencies. There are many cases, I think,

(Testimony of Frank B. Rowley.)

where you want a higher efficiency than the 75 per cent. If you have a certain fine dust in there that is going to discolor the room walls and places, where you want that fine dust taken out, then you have got to have higher efficiencies.

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Well, the phrase used in Exhibit 4 by the defendant is "remarkable efficiency." Do these Exhibits HH and 13 reveal that the P-5 filter has a remarkable filter efficiency?

A. Well, I think that term "remarkable" is relative, and if they want to call their efficiency remarkable, I think that is permissible. I think it is something that different people would give a different value to.

Q. Would you say there is anything remarkable about [766] the defendants' P-5 filter in its filter efficiency?

A. Well, I think it has a good average efficiency, with a low resistance, a good filter.

Q. You think it is remarkable in that sense?

A. No, I don't know that I think it is remarkable in that sense.

The Court: You think this might be a little poetic license or a salesman's puffing?

The Witness: I think a great many of these curves are salesman's license, that you are getting.

By Mr. Leonard S. Lyon:

Q. Now, continuing in the bulletin, Exhibit 4, the next reference is to its low static pressure drop.

(Testimony of Frank B. Rowley.)

Do you think that Exhibits HH and 13 both evidence that the Air-Maze P-5 filter has a low pressure drop?

A. I think the pressure drop is relatively low in that filter, yes.

Q. What?

A. Yes, I would say that is a low pressure drop.

Q. And in that sense, do not Exhibits HH and 13 both reveal that the Air-Maze P-5 filter has an efficiency and a pressure drop comparable to that of the patented Farr filter?

A. Well, the pressure drop starts off at about the same in both, but changes as you go up through the loading of the filter, the relation changes. [767]

Q. But within the limits of these tests, are they not very similar?

A. They are similar but not the same. There is a difference indicated in the tests.

Q. And is your answer the same as to the pressure drop?

A. That is what I was talking about, the pressure drop.

Q. I thought you were talking about the filter efficiency.

A. The same applies to both, only in a different manner. There is a difference as you progress with the test between the respective values.

The Court: You mean it has a low static pressure drop compared to that on the chart, your chart on the French patent that you tested?

The Witness: It has a lower one than that and

(Testimony of Frank B. Rowley.)

also lower than some others. The pressure drop in filters varies and it is adjustable. That is, you can change the pressure drop in the design of the filter with the same principle. And these two filters do have low pressure drops.

Mr. Leonard S. Lyon: Exhibit MM is the exhibit you are looking for, your Honor, I think.

The Court: Yes, the clerk has handed it to me.

The pressure drop is the key to the success of a filter?

The Witness: Not necessarily.

The Court: In its continued use, or the key to the [768] longevity of it?

The Witness: It is a key, we would say, to the amount of dust it would hold, but it may not be a key to the success of it because usually a filter with a high pressure drop, the same design, will have a higher efficiency.

If you want high efficiency then you must sacrifice in the pressure drop. You can't very well get a low pressure drop and get up into the high efficiency.

The Court: Assume a filter would run between 70 and 80 efficiency, to begin with. The longer you can keep the pressure uniform, why the longer that filter can remain in use?

The Witness: That is true, provided it is doing the work.

The Court: Assume that it is.

The Witness: If it is efficient.

The Court: Assume that it maintains within the



(Testimony of Frank B. Rowley.)

range as shown by the various charts, within the range of the P-5 and the Farr filters ?

The Witness: That is correct.

By Mr. Leonard S. Lyon:

Q. Now you have stated that the third factor of significance in the performance of these filters and the type we are now inquiring about, is its flow rate.

Have you made any tests to determine the comparative flow rates for which the P-5 filter and the Farr patented filter are adapted? [769]

A. Well, if I understand your question, you mean did I have flow rates on those filters?

Q. Yes.

A. No, the tests I made was 300 feet per minute on the filters, both of them.

Q. You made no other tests?

A. I didn't make any high velocity tests.

Q. You don't know whether they are both adapted for higher velocity flow rates or not?

A. No, not from my tests.

Q. Well, now, the third and next statement in the defendant Air-Maze catalog with reference to the P-5 filter—I am referring to Exhibit B—is that it has large dirt holding capacity.

Have you made any tests to determine the comparative dirt holding capacity of the P-5 filter and the plaintiff's patented Farr filter?

A. Well, my curve shows the dirt holding capacities for the various points up to the limit of those tests.

(Testimony of Frank B. Rowley.)

Q. How would you say they compare, substantially the same?

A. Well, they are substantially the same, yes. There is a little difference but not much.

Q. The statement is that that is a large dirt holding capacity. Do you agree that it is a large dirt holding [770] capacity?

A. I think that is the same as the other statements. It depends on who is making the statement and the purpose of its relatively.

Q. You haven't produced any curves for the old style type B Air-Maze filter, have you? Do you know what I am talking about?

A. I suppose it is the one that is in evidence here. I haven't examined it very closely.

Q. I show you Exhibit 5. Did you ever make any filter efficiency and pressure drop tests on that type of filter?

A. Well, I presume that that was in some tests that I made for the Association of Railroads. I don't know whether it was this particular type or not. I don't remember now what the shape of it was or the design.

Q. Along about 1937 you studied and tested the performance of the then typical air filters of the impingement type that was suitable for passenger car service, did you not? A. Yes.

Q. Are those the same tests that you refer to in your testimony on direct examination?

A. That is the same program; yes.

Q. They included tests on the Detroit paper filter or filters of that type, did they not?

(Testimony of Frank B. Rowley.)

A. They included tests on several different types of [771] filters. Manufacturers submitted their filters and those were the tests, and I explained that the filter manufacturers all met and decided on the test dust, and that was the dust used in those tests. It was a mixture.

Q. Those included tests of impingement filters made by the Air-Maze Corporation, is that correct?

A. Yes, I think Air-Maze.

Q. What? A. Yes.

Q. And to the best of your knowledge the type of filter that was then being made and which you tested of the Air-Maze Corporation was like Exhibit 5, was it not?

A. Well, as I say, I don't remember the exact Air-Maze filter design. It was probably of that order. I don't know whether they have changed this design since then or not.

Q. Could you detect any difference in Exhibit 5 from the device that you used?

A. It would be pretty hard to detect what is inside of this filter. You can see the outside wire but what is in inside of there is pretty hard to detect. I don't know what the construction is in this filter.

Q. Can you tell us what type by title or number of Air-Maze filter you tested in 1937?

A. Well, the only thing I know is Air-Maze. I am not sure whether I have a number. I don't know whether I have a [772] type on it or not.

(Testimony of Frank B. Rowley.)

Q. Did Mr. Baldwin have any part in those tests?      A. Not that I know of.

Q. I thought maybe he could tell us.

The Court: Which one was it? Could it have been A, B-1, C or D?

The Witness: It is not on that list, your Honor. It is another program.

The Court: It is another test?

The Witness: Yes. This was a program——

The Court: For the railroads?

The Witness: ——for the railroads, as I explained.

The Court: Did you not make any notes on what you tested?

The Witness: I don't have those here. That was in 1937.

I would like to state though that those tests were made, as I explained, at the request of the railroads. The manufacturers and railroad men all met and selected pointly a test dust. Now that dust was composed of a different mixture than any of the dusts we have been talking about here. We had Fuller's earth in it which we didn't have in any of these.

By Mr. Leonard S. Lyon:

Q. That also included a test made on filters made by [773] the American Radiator Company, did it not?      A. Yes.

Q. Those were paper filters?

A. Those were paper filters.

Q. Of the throwaway type?      A. Yes.

(Testimony of Frank B. Rowley.)

Q. And are those the tests on paper filters which you referred to in your direct examination?

A. No.

Q. Those were different tests?

A. Those tests I referred to in the direct are in this bulletin No. 6, I believe, that was put in evidence.

The Court: I think you did testify that you had conducted some tests for the American Association of Railroads.

The Witness: Maybe I did, but these are different tests. It is the same filters, substantially the same. They were gotten at a different time, however. They were probably the same filters, but it is a different set of tests that he is talking about and it was a different test dust that was used.

By Mr. Leonard S. Lyon:

Q. I show you a document entitled "Report on the Relative Performance of Air Filters," dated January 15, 1938, with the legend, "Mechanical Division, Association of American Railroads, Chicago, Illinois."

(Exhibiting document to counsel.) [774]

By Mr. Leonard S. Lyon:

Q. Did you ever see this report before?

A. Yes, I think so from what you say it is.

Mr. Leonard S. Lyon: I ask that it be marked for identification.

The Clerk: No. 27.

(Testimony of Frank B. Rowley.)

(The report referred to was marked Plaintiff's Exhibit No. 27 for identification.)

Mr. Leonard S. Lyon: On page 4 under the title "Extent of Research Program" in this Exhibit is the following:

"The information contained in this report was obtained from the following sources:

"1. Control laboratory tests conducted under the direction of Professor F. B. Rowley at the University of Minnesota.

"2. Road tests conducted on the Illinois Central diesel electric train, the Green Diamond, operating between St. Louis and Chicago.

"3. A questionnaire which was sent to those railroads that are foremost in passenger car air conditioning."

Q. The Professor F. B. Rowley referred to there is yourself, is it not?

A. Yes, that is correct.

Q. And did you not conduct the tests that are set [775] forth in this report?

A. I conducted the tests that they reported on.

Q. And did you furnish the curves that appear here?

A. I furnished them the test data. I think they drew their own curves.

Q. Did you ever check them?

A. Well, I can't say that I checked them exactly. I made the tests, gave it to them, and they made the curves.

(Testimony of Frank B. Rowley.)

Q. And did you have a chance to see this bulletin before it was published?

A. Not the final bulletin; no.

Q. The data that is in it?

The Court: Was it submitted to you?

The Witness: No, it wasn't. I gave them my tests and they wrote this bulletin.

By Mr. Leonard S. Lyon:

Q. Did you ever read this bulletin before?

A. Yes, I have read it.

Q. Did you ever check to see whether it correctly set forth the results that you obtained and furnished to the railroads?

A. Well, I didn't check the detail, no. I gave them my test results and I assume they wrote them up correctly.

The Court: Did you test the curves?

The Witness: With my data? [776]

The Court: With your data.

The Witness: No.

The Court: To see whether or not the curves were correct?

The Witness: No, I just submitted it to them. They sent them out. I suppose they did, but I didn't check it.

By Mr. Leonard S. Lyon:

Q. Didn't they submit any of this data to you before it was published?

A. No, they took our test data and published it and sent me the copy of it.

(Testimony of Frank B. Rowley.)

However, I am not questioning but what they did it correctly. But I didn't check it.

Q. Following page 16 of this bulletin is a picture showing Fig. 3, Fig. 4 and Fig. 5 over the legend "Air-Maze Corporation."

Did you furnish the railroads with those pictures?

A. I presume I did because I furnished them pictures and I expect these are probably the pictures that we took during and after the tests.

Q. And does that show the filter of Air-Maze Corporation that you tested?

A. This shows the picture of the filter that I tested, yes. That is probably correct.

Q. Can you compare those photographs with Plaintiff's [777] Exhibit 5 and state whether or not apparently Exhibit 5 appeared in those photographs?

A. Well, the part of Exhibit 5 that would appear is this front screen. As I say, I don't know what is back of this screen anymore, whether they have changed their design or not. I just don't know.

The Court: Is that not a picture front and back?

The Witness: These are the pictures before the tests and after the tests, and this is a lint test.

It is all one side. This was the test of the filter as compared to this. (Indicating.)

The Court: Did you take the filter apart to see what was inside?

The Witness: No, not the metal ones.



(Testimony of Frank B. Rowley.)

The Court: Did you set forth in your findings how it was constructed?

The Witness: No, just the Air-Maze filter.

By Mr. Leonard S. Lyon:

Q. At that time had you ever examined the inside of an Air-Maze filter?

A. No, we didn't take the metal filter apart.

Q. I mean at that time. A. No.

Q. Were you familiar with the construction of an Air-Maze filter? [778]

A. Well, excepting that I knew that it was built of metal screen mesh, but I didn't know how many they put in or what the details were, because they submitted the filters through the railroads and we didn't have anything to do with the selection of the filters.

Q. At that time to your knowledge was the Air-Maze Corporation making more than one type of impingement filters using wire screen?

A. I don't know what they were making at the time.

Q. Referring to the next page of this exhibit entitled Figure 6, do you understand that those are curves plotting the results that you obtained in testing the Air-Maze filter, the first curve showing the filter performances and the second curve showing the pressure drop?

A. These were curves which they undoubtedly plotted from my test data that I sent them. I didn't check it. It does show arrestance and resistance, that is true.

(Testimony of Frank B. Rowley.)

Q. Now what does it show the filter efficiency to be?

A. Well, the filter efficiency starts out in that curve about 84 per cent and then it drops down at the end of three and a half hours to probably 79 per cent. It follows fairly closely the 80 per cent line until at the end of 10 hours, then it rises, and from there on it is approximately 85 per cent to the end of 16 hours.

Q. Is that in accordance with the values you actually [779] obtained in your tests?

A. I have explained that, that I sent this test data in and I suppose they plotted it, as far as I know, correctly.

Q. Now referring to the bottom curve, what was the pressure drop across that filter when the filter was clean and the test was started?

A. Well, it is about .18 inches of water. [780]  
By Mr. Leonard S. Lyon:

Q. And what was the result there at the end of the test, after 15 hours?

A. After 15 hours it was .38.

The Court: And what does it indicate there?

The Witness: That was a mixture of 50 per cent Pocahontas ash, 20 per cent Eagle Brand lamp black, a different type of lamp black, 10 per cent Fuller's earth, and 10 per cent fly ash. We used Fuller's earth in these tests.

The Court: What is the difference between Pocahontas fly ash and fly ash?

The Witness: Well, I suppose it is all the same.

(Testimony of Frank B. Rowley.)

The only thing is that they don't burn Pocahontas in the furnaces?

The Court: What is Pocahontas?

The Witness: Pocahontas is a special grade, a special type of coal, a smokeless type of coal, used more in residences.

By Mr. Leonard S. Lyon:

Q. What type of oil did you use on the filter, the Air-Maze filter, in that test?

A. This was marked as heavy oil, so I suppose that was a heavy oil, probably a 40 or heavier S.A.E. I don't remember what the term was, heavy or light oil.

Q. On the next page I find another curve sheet with performance curves, the top curve showing the filter efficiencies, and the bottom curve the pressure drop; that is [781] correct, is it not?

A. Yes.

Q. And this curve, which is Fig. 7, states that it is a dust test performance curve for 4-inch, viscous coated, Air-Maze filter, using light oil. What is the difference between this test and the preceding one? Is it that this test used light oil and the other test used heavy oil?

A. That was one difference.

The Court: What is this, a 4-inch filter?

The Witness: This was a 4-inch.

The Court: And the other one was a 2-inch?

The Witness: No. They are both 4-inch filters.

By Mr. Leonard S. Lyon:

(Testimony of Frank B. Rowley.)

Q. Well, they were both the same filter, were they not?

A. I can't say whether they were both the same filter. They were probably both the same design.

Q. Well, they may have been the same filter?

A. They may have been the same filter. I don't know.

Q. Referring to this Fig. 7, will you state to the Court what you found the filter efficiency of that device to be?

A. Well, the arrestance started out at 75. It ran a little above 75 for the first seven hours, and then, from seven to eleven hours, it ran almost exactly 75. Then it began to go up, and at fifteen hours it was  $75\frac{1}{2}$ , and at [782] twenty hours it was 89.

Q. Now, referring to the curve in Fig. 7 showing the pressure drop that you found in this test, what was the initial pressure drop when the filter was clean?

A. When the filter was clean, the pressure drop was .15, and it ran along at .15 without any apparent changes there for the first eleven hours, and then it began to rise, and at the end of twenty hours was .39.

The Court: Does it show the load there, too?

The Witness: It shows the time in hours.

The Court: But not the load?

The Witness: Not the load, no.

The Court: You don't have the same graph here?

The Witness: No. It is not the same.

(Testimony of Frank B. Rowley.)

The Court: For weight in dust load in filter grams?

The Witness: No.

The Court: That does not show that in either one of those charts?

The Witness: No.

The Court: How fast did you feed it?

The Witness: The rate was slower, as I said, at 20 grams per hour instead of 40.

By Mr. Leonard S. Lyon:

Q. And at what pressure drop flow rate?

A. 300. [783]

The Court: 300.

By Mr. Leonard S. Lyon:

Q. Now, will you compare Plaintiff's Exhibit 11—there is a curve on Plaintiff's Exhibit 11 for the Air-Maze Type B filter efficiency—will you compare that with the filter efficiency curves in Figs. 6 and 7 of this exhibit, Exhibit No. 27, with that curve, and tell me if they are substantially the same, making due allowances for the difference in dust and the difference in test conditions?

A. Well, this filter here is a 4-inch filter? Isn't this a 2-inch filter?

Q. This is a 2-inch.

A. A 2-inch, and this is a 4-inch (indicating)?

The Court: A 2-inch.

The Witness: That is 2-inch.

The Court: That is Type B.

The Witness: That is the one here.

The Court: That is the one in evidence here,

(Testimony of Frank B. Rowley.)

according to the testimony. Exhibit 11 was compared with the Air-Maze Type B, which is Exhibit 5, isn't that correct?

Mr. Leonard S. Lyon: This is a 20 by 20 with a 2-inch thickness.

The Court: Yes. That was the testimony of Professor Duncan.

The Witness: And this is a 4-inch. [784]

By Mr. Leonard S. Lyon:

Q. Oh, these tests, Fig. 6 and Fig 7 of Exhibit 27, were made on an Air-Maze filter which had a size of 20 by 20 with a 4-inch thickness?

A. A 4-inch thickness.

Q. I got the impression that it was 4 inches square.

A. No. It is a 4-inch. They are two different filters altogether.

The Court: I understood the witness' testimony they were a 4-inch filter.

The Witness: This is a 4-inch.

By Mr. Leonard S. Lyon:

Q. Can you answer the question, comparing the curves that I have called your attention to, and making due allowances for the difference in thickness of the filters and the different test conditions and the different dusts, and state whether or not the filter efficiency curves appear to be substantially the same?

A. No, I couldn't do that, because you have two different filters, two different designs, and two dif-

(Testimony of Frank B. Rowley.)

ferent dusts. I don't see how you could compare them. At least I couldn't.

Q. Well, now, can you make a comparison of the pressure drop curves in Figs. 6 and 7 of Exhibit 27 with the pressure drop curve for the Air-Maze Type B filter [785] shown on Exhibit 11?

A. Well, I can compare what you have in these two tests as pressure drop, but they are two different filters with two different thicknesses. The pressure drops aren't comparable.

Q. Well, you would say, would you not, that the pressure drops for the Air-Maze Type B filter, as shown both in your Figs. 6 and 7 of Exhibit 27 and on the curve for the Air-Maze Type shown on Exhibit 11, were both relatively high at the end of the test as compared with the pressure drop that you have covered with reference to the Air-Maze P-5 filter?

The Court: You refer to the Exhibit JJ filter?

Mr. Leonard S. Lyon: Yes.

A. Well, the pressure drop rises faster toward the ends of the tests, in both cases.

By Mr. Leonard S. Lyon:

Q. And goes up to approximately a value of around .4, does it not?

The Court: .5, it says here on Exhibit 11, .5.

Mr. Leonard S. Lyon: Yes, but I think maybe on Exhibit 11 they went a little longer on the test, your Honor.

The Witness: Well, on that one, Exhibit 11, it is up near .5 on the curve. I don't know where this

(Testimony of Frank B. Rowley.)

test stopped because there are no points on this curve to show just what the points are. This curve, on this test we are referring to, [786] Fig. 7 on Exhibit 27, is a little below 4/10 of an inch at the end of the test.

By Mr. Leonard S. Lyon:

Q. Well, you have the term in hours of the test on Figs. 6 and 7?

A. Twenty hours on Fig. 7.

Q. And can you not find on Exhibit 11 on the point on the curve that represents 20 hours?

The Court: Well, it was fed in at the rate of 20 grams per hour, that was his testimony, I believe, wasn't it?

The Witness: Well, he is talking now about this Exhibit 11.

The Court: Yes, I know, but it was fed in at 20 grams an hour.

The Witness: But this is dust load. You have to multiply the feed by the efficiency. It doesn't show on this curve that I can see.

The Court: I guess it wouldn't.

The Witness: You would have to multiply the feed by the efficiency.

The Court: You would have to multiply the feed by the efficiency to get the percentage of the dust obtained.

Mr. Leonard S. Lyon: That is too hard. I will get Mr. Duncan to do that for us.

Q. But am I not correct that you found the Air-Maze [787] filter that you tested in 1937 to



(Testimony of Frank B. Rowley.)

have a marked rise of pressure drop, after the filter had been run for some 12 hours or so?

Mr. Baldwin: I object. The question asks for "a marked rise." I don't believe that is definite.

The Court: Oh, it is cross-examination. Objection overruled.

A. The pressure drop up to 12 hours was practically nothing on this curve. Then it began to go up, and it went up from there to 20 hours, to .39, something like that.

By Mr. Leonard S. Lyon:

Q. Did you ever find a result of that magnitude of pressure drop in any test that you made on the defendants' P-5 filter?

A. I haven't tested his filter up to that rise. This was a 4-inch filter, and I haven't tested the defendants'.

Q. The P-5 filter.

The Court: The Air-Maze.

By Mr. Leonard S. Lyon:

Q. The Air-Maze?

A. No, sir, I haven't gone that far, I haven't tested that far. I haven't carried the test that far in the volume. My tests were on those curves.

The Court: Why did you use the velocity there of 300 feet per minute? [788]

The Witness: That would be standard test velocity that would be used in practically all tests of filters.

(Testimony of Frank B. Rowley.)

The Court: Is it comparable to the ordinary commercial use of installations?

The Witness: Yes.

The Court: Are there any installations where it is higher?

The Witness: Yes.

The Court: As much as 500?

The Witness: Yes.

The Court: Or 2,000?

The Witness: Not in this type of filter. I would say 2,000 is much too high.

The Court: Well, are there velocities where filters are used against air of that velocity?

The Witness: With this type, at 2,000?

The Court: Yes.

The Witness: With this type of filter, if you went up to 2,000, it would take the dust right off the wire, it wouldn't stick, it would take it off from the filters.

The Court: Well, then, the higher velocity, the greater the tendency of the air to blow dust off the filter?

The Witness: That is correct.

The Court: So that, with a lower velocity of air, with [789] the same dust, should show a greater efficiency rating and a higher pressure drop?

The Witness: Providing—it shouldn't necessarily, unless the velocity was high enough to take it off. Now, you might go up to high velocity.

The Court: Well, the difference between 300 feet per minutes and 519 feet per minutes is 219 feet per

(Testimony of Frank B. Rowley.)

minute. Is that a sufficient change in velocity to affect the efficiency?

The Witness: I don't think it would, in taking the dust out, no.

The Court: Or blow it through without giving it a chance to adhere?

The Witness: No, I don't think it would, at 519.

The Court: Would the efficiency of any of these impingement filters be decreased if this viscosity in your material were increased? I don't know what your "S.A.E." means, but in the oil fields they talk about 12 gravity oil, which I know is about asphalt. Would that increase your efficiency?

The Witness: Well, it goes two ways. Sometimes, if you go higher in the viscosity of the oil, you get more efficiency, and at other times you get less. You can't say definitely that you are going to get more or less. Now, with different grades of oil and the same filter, you will get different efficiencies, and you can't always predict, with a change of oil, just which way you are going. It takes [790] some experimental work to determine that.

The Court: Well, suppose you put 12 gravity oil on the Air-Maze P-5 filter, would that collect more dirt than the 40 oil, and assuming all the others the same, the Pocahontas and at 20 grams per minute and at 300 rate of flow.

The Witness: I think a heavier oil, that heavy, would not collect any more dirt. Now, I found with

(Testimony of Frank B. Rowley.)

the P-5 that when I used a 30 instead of a 40, it did collect more dirt on the filter.

The Court: Supposing you dropped it to 20. That is kind of thick?

The Witness: From the tests I made, not going to 20, it might be better than going too low and not getting as good results.

The Court: How do you account for that?

The Witness: Well, the viscosity of the oils, the thickness change, and your velocities, so that your dust particle, as that strikes the oil, it will either stick or be blown off.

The Court: Suppose you reduced the velocity of the air that is coming into this room here now, as it passes through the air conditioner, what effect would that have? I don't know where it is in the ventilating system except I know the intake is in the garage. That was "fine" engineering, for fresh air. Suppose that the velocity of air were [791] reduced to a hundred feet a minute and you had a heavy oil, would that increase the efficiency, that is, the dirt-carrying capacity, or arrestance——

The Witness: No.

The Court: ——as you call it?

The Witness: No. You are talking about the velocity through the filter, and if you increase it up here, the filter is way down there.

The Court: No. Wherever you measure the velocity. I understand you measure your velocity at the face of the filter.

The Witness: That is correct.

(Testimony of Frank B. Rowley.)

The Court: And suppose you reduce it to a hundred feet per minutes and increased the viscosity of the oil, say, to 12 gravity or 14?

The Witness: I think that would probably reduce the efficiency because the particle probably would not strike hard enough to be projected onto the wires.

The Court: It wouldn't strike hard enough to stick?

The Witness: To stick.

The Court: And did I understand you to say that in ordinary commercial installation, such as in this building, that experience shows the velocity of the air to be about 300 feet per minute?

The Witness: That is through the filter. [792]

The Court: That is at the face of the filter?

The Witness: That is right. Up in here, the velocity is higher than that.

The Court: Yes, here at this end.

The Witness: Yes.

The Court: It is blown out of a smaller hole, and sometimes it gives me a pain in the neck.

The Witness: I would think it would.

The Court: Well, in an ordinary railroad Pullman car, like a sleeper or diner, what is the velocity of air going through the filter?

The Witness: That might be the same as the building, 300 or higher. It used to be, when we tested these filters for a railroad, they stipulated 300 per minute, but of course, on account of the crowded space, they wanted to go higher if they could.

(Testimony of Frank B. Rowley.)

The Court: They don't have a fan sucking the air in?

The Witness: Some of them do, and some of them have a fan——

The Court: Then, with the speed of the train, with the air going through, how is that exposed, face onward or sideways?

The Witness: Sideways. The exposed face is generally so it doesn't affect the flow. If it did, it might affect it either way. [793]

The Court: And you say that is about 300?

The Witness: 300 or above that. They are about that. When we made these tests, 300 was the considered velocity.

The Court: If I understand you, the difference between 300 and 519 is not sufficient to make any difference in the result?

The Witness: Well, probably not much difference in the result, that is correct. I can't say it wouldn't make any difference, but I wouldn't say it would be a material difference, excepting——

The Court: Well, let me see if I understood you correctly. Increasing it from 300 to 519 would not increase it enough so that it would blow the particles through it without adherence, assuming all the others the same?

The Witness: I think that is correct, substantially. There are little differences, but on your point I think they are about the same.

The Court: I haven't any point.

The Witness: The pressure drop through the filter—if you ran the air through that filter at 500,

(Testimony of Frank B. Rowley.)

you would have higher cost in filtering and raise the cost almost double what it is at 300, but it wouldn't in my opinion, change the efficiency or arrestance.

The Court: You have not conducted any experiments at all with your Pocahontas dust at a 519 rate of flow? [794]

The Witness: No.

The Court: Or with any other dust at 519 rate of flow?

The Witness: No.

The Court: Or at any greater flow?

The Witness: Oh, yes, we have run up to 400 on some of our tests.

The Court: I mean greater than 500.

The Witness: Not on these filters.

The Court: With any filters?

The Witness: Not on this type of filter.

The Court: On any impingement type of filter, you have not conducted any experiments where the flow was greater than 519?

The Witness: Well, I do not recollect any. We have run them to get our resistance value, but I don't know whether we have made any research or not. But we haven't on any commercial filter.

The Court: You haven't done any on any commercial filter?

The Witness: No, sir.

By Mr. Leonard S. Lyon:

Q. Did you mean to testify that the reason, in your opinion, that the Air-Maze filter tested, with

(Testimony of Frank B. Rowley.)

the results shown in Figs. 6 and 7 of Exhibit 27, had a pressure drop rise up to approximately .39, was because it was a 4-inch thick filter as compared with the 2-inch filter?

A. No, I don't think I testified to that. [795]

Q. Have you any opinion as to whether a comparable pressure rise would have occurred with a 2-inch thick Air-Maze filter of the same type?

A. Well, it depends on the design of the filter and how the wires are arranged inside, and so forth. If you had a 2-inch filter with exactly the same type that would mean you would spit the filter in two, then I wouldn't expect it to rise.

The Court: In other words, the 4-inch filter has a greater initial pressure.

The Witness: It has more resistance; that is correct.

By Mr. Leonard S. Lyon:

Q. How about a final pressure drop at the end of the test, would it be greater or less in the case of the 2-inch filter than the 4-inch of the same design?

A. Well, it depends on the filter, how it took the dust out and how the dust was distributed through the filter.

Now you can have a 4-inch filter or a 2-inch filter in which the greatest dust catching area is at some section in the filter, and the rise would be very rapid for a small hole.

Other filters spread the dust caught through the filter and then the rise is slower.



(Testimony of Frank B. Rowley.)

But there are differences in design. Some filters will plug up or form high resistance at the entrance, and others someplace back in the filter. It depends on how the filter [796] media is arranged in there and to a certain extent what kind of dust you use in that test.

Q. Can you remember now whether the tests you made with an Air-Maze filter for the railroads included a test with a 2-inch thick Air-Maze filter?

A. I don't recollect. I might have. I don't know whether I did or not.

Q. I show you Figure 8 of Exhibit 27 entitled "Dust Test Performance Curves for 2-inch Viscous Coated Air-Maze Filter Using a Heavy Oil." Did you make such a test?

A. Apparently I did. This is reported here.

Q. And these are the results of that test?

A. These are apparently the ones I sent to them, to the railroad officials.

Q. Now, then, you stated that there would be a difference in the initial drop when the filter was clean, whether it was a 2-inch or a 4-inch filter. Will you compare the initial pressure drop on Figures 7 and 8 and state to the Court if there is any difference?

A. I don't think I stated that the pressure drop would be the same on a 2-inch or a 4-inch filter when it is clean.

Q. I thought you said it would be different.

A. It depends upon the design. Now you may have a 4-inch filter with the same initial pressure

(Testimony of Frank B. Rowley.)

drop as a 2-inch filter. It depends on what material you put in that filter. [797]

Q. Was there any difference in the filters that were tested and reported in Figures 7 and 8 of this Exhibit 27 except one was 4 inches thick and the other was 2 inches thick?

A. I think there must have been a difference.

Q. Do you remember?

A. Well, I didn't look in it. I don't know. They are different filters and I don't know what they are inside.

Q. Do you know if there was any difference between them except one was 2 inches thick and the other was 4 inches thick?

A. Well, I would think from the looks of the resistance curve there must have been a difference because the resistance curve on the 2-inch shows an initial resistance of .15 and I believe that is the same as on the 4-inch.

Q. That is right.

A. So there must have been a difference. They couldn't have been the same design.

Q. What does it show the final pressure drop at the end of the test to be?

The Court: On the 2-inch?

Mr. Leonard S. Lyon: On the 2-inch.

The Witness: On the 2-inch at the end of the test the final pressure drop was .44.

The Court: 144? [798]

The Witness: .44.

\* \* \* \* \*

(Testimony of Frank B. Rowley.)

The Court: On your Exhibits II, HH, JJ, MM, and KK—that is the defendants' exhibits—I understood you to testify that the dust was the same, the rate of feed was the same and the speed of the air was 300.

The Witness: Yes, sir.

The Court: Now if I understand the answer to the questions which I asked you a few moments ago, these curves would be just the same if the rate of flow had been increased to 500 or 519?

The Witness: Yes, that is correct. The upper curves, the arrestance curves, would be substantially the same. Not the resistance curves, they would have been changed.

The Court: How would they have been changed?

The Witness: The resistance would have been higher. They would have been practically twice as high.

The Court: It would be increased?

The Witness: Yes.

The Court: So it is a tougher test to give it 519 than 300, is that it?

The Witness: It is a higher resistance. It is a greater resistance across the filter when it is going through. [799]

The Court: Then take Plaintiff's Exhibits 11 and 13. You are familiar with these two charts?

The Witness: Yes, I am.

The Court: And if I understand you correctly—let me take Exhibit 13 because Exhibit 11 is different.

(Testimony of Frank B. Rowley.)

Exhibit 13 states that the velocity was 519 feet per minute.

The Witness: That is correct.

The Court: On the Farr type and on the P-5. If I understand you correctly, these lines or curves on this chart would be substantially the same if the flow had been 300 feet per minute?

The Witness: The upper curve, that is correct.

The Court: And the lower curve, what would it have been?

The Witness: That would have been lower on that chart.

The Court: It would have been lower?

The Witness: That is right.

The Court: In other words, the pressure drop would not have increased as much measured in inches?

The Witness: Provided that they used the same dust.

The Court: This says that they used the same dust in both these tests.

The Witness: They used the same test, but not the same dust.

The Court: I understand, but I had understood your [800] testimony to be to the effect that no matter what dust is used that the difference in velocity between 300 feet and 519 feet was not sufficient to affect the efficiency of the filter.

The Witness: That is correct.

The Court: Then do I understand you to say that these curves on Exhibit 13 would be the same if the velocity had been only 300 feet?

(Testimony of Frank B. Rowley.)

The Witness: I think they would have been substantially the same, the upper curves.

The Court: What about the lower curves, would they have been substantially the same?

The Witness: No, it would have been lower.

The Court: Substantially lower?

The Witness: It would have been substantially half. That difference between that and mine is due to the difference in dust, different types of dust.

By Mr. Leonard S. Lyon:

Q. Do you mean by half that the initial pressure would be half and that the final rise would be half, so that the curves just lie on a different elevation on the sheet but would be the same shape of curve, or do you mean to say that there would be a proportionate difference anywhere in the curve?

The Court: From the beginning to the end?

Mr. Leonard S. Lyon: Yes. [801]

The Witness: It would have been substantially half.

By Mr. Leonard S. Lyon:

Q. At the end? A. At the end.

Q. The rise would have been half at the end?

A. That is right.

Q. Or would it be half at the beginning and half at the end?

A. It would be half each place all along the line, just about.

Q. Then it would be substantially the same curve?

A. Substantially the same except it would be lower.

(Testimony of Frank B. Rowley.)

Q. Except it would be lower?

A. But it wouldn't be parallel to that because you drop down more on this end than you would on the other.

The Court: Now on Plaintiff's Exhibit 11, it has the curve here of the Farr device at 519 feet per minute and the Air-Maze Type B device at 346 feet per minute. That is the old Air-Maze Type B.

Do I understand you to say that these curves should be substantially the same if the Farr device had introduced the air at the same rate as the other of 346 instead of 519?

The Witness: I would think it would be substantially the same. I can't say exactly.

\* \* \* \* \* [802]

By Mr. Leonard S. Lyon:

Q. Exhibit 27 contains the results of tests you made on the American Radiator Company filters for the railroads, does it not?

A. Yes.

Q. Those included paper filters of the throw-away type?

A. That is what they were, yes; paper filters.

Q. And are those the same tests that you referred to on your direct examination that you said you had made with paper filters?

A. No, these aren't the tests reported in there that I referred to.

Q. You didn't produce any curves or test data showing the results of those tests. Can you do so?

(Testimony of Frank B. Rowley.)

A. I think they are in Exhibit 6, the ones I am talking about, pamphlet 6.

Q. Exhibit what?

The Court: In this pamphlet NN?

The Witness: NN, yes.

By Mr. Leonard S. Lyon:

Q. But you have no other curves that you can produce showing the filter efficiency and the pressure drops in those tests? [803]

A. No, I don't have any other here excepting those that I put in evidence.

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Will you refer to the curves in Exhibit NN and wherever there is a report or a curve showing the initial pressure drop and the final pressure drop in the test made on a paper filter, give us the figures.

A. (Examining exhibit) On filter C, which is the one I think you are referring to, in Figure 4 the initial pressure drop is .15, and the final pressure drop in each of the tests is .32 inches.

The Court: What was the dust load?

The Witness: The dust feed in that filter——

The Court: No, the load at that time.

The Witness: Unfortunately I have to multiply it out. The basis is the dust feed total and for one of the tests it was one type of dust mixture, which was 440 grams, and for the other one it was 560 grams.

Now I would have to multiply those by the effi-

(Testimony of Frank B. Rowley.)

ciency to get the dust holding capacity. It isn't in the curve.

The Court: Very well. [804]

By Mr. Leonard S. Lyon:

Q. Now, then, Figure C shows a rather uniform progression in the increase of the pressure drop, almost a straight line curve, is it not?

A. It curves up a little as it goes out, not exactly a straight line.

Q. But nearly a straight line?

A. Nearly a straight line.

Q. Has that been your uniform observation of what the results you obtain on measuring pressure drop curves with paper filters is?

A. Well, I wouldn't say that all run up to the same. I think it depends on how the dust loads in the filter and the type of dust.

Now sometimes you get a curve that would run flat a little ways and then turn up.

Q. In paper filters?

A. Well, there are several makes of paper filters, of course, several types. And the rise in pressure isn't necessarily a straight line.

Q. Have you in testing paper filters had the experience of having a pressure rise from an initial value of about .15, continued flat for 10 or 12 hours, and then markedly rise in its next few hours to a value of about 1.4 inches?

A. I don't recollect any where I had that condition, [805] no. Sometimes it doesn't rise as fast



(Testimony of Frank B. Rowley.)

but I can't say that I have had them test where they remained flat like that.

Q. Have you had them rise as high as I have indicated, from an initial of 1.5 up to a value of around .4?

A. Yes, I have had them rise up that high, from .15, I think you mean, to 1.4.

Q. Isn't that a type of paper filter?

A. No, it depends on how long you run them.

Q. Has it been your experience generally that paper filters show that?

A. Well, it depends on the rise. It depends on how much dust you put in the filter, how long you run the test, and the various conditions. Of course you can run any test long enough to get that rise.

Q. I show you the page following page 30 in Exhibit 27. There are three pictures, Figure 20 before testing, Figure 21 after dust test and Figure 22 after dust and lint test, over the title "American Radiator Company."

A. Those are evidently tests made for the American Railroads.

The Court: 20x20 in size?

The Witness: Yes.

The Court: How thick?

The Witness: They were substantially 2 inches.

Mr. Leonard S. Lyon: I think it shows here.

The Witness: Well, there was one of them one and three-quarters and the other four inches. I am not sure which one is which in the curves here.

By Mr. Leonard S. Lyon:

(Testimony of Frank B. Rowley.)

Q. Now on page 30 under the legend "Description" the following appears: "Cellular type with large cells on inlet and small cells on outlet. The 4-inch type for combined outside and recirculated air made with four passages viscous loading."

How did those filters compare with those on which you made the tests that are reported in Exhibit NN?

A. Well, those on the Exhibit NN were a different lot of filters. I don't know what the coating was on the cells of either one of them now.

Q. Were they the same filters, same type of filters?      A. Same general type.

The Court: That is, large opening and smaller opening at the exit?

The Witness: I am not so sure that they were as large as this. They were larger on the entrance side and smaller on the exit side.

By Mr. Leonard S. Lyon:

Q. How did they compare with——

Do we have Exhibit C here, Mr. Clerk?

(The exhibit referred to was passed to counsel.) [807]

The Court: There are two or three of them. There is another one with smaller holes on the other side.

Mr. Leonard S. Lyon: Exhibit N.

(The exhibit referred to was passed to counsel.)

(Testimony of Frank B. Rowley.)

By Mr. Leonard S. Lyon:

Q. My question is, how did these filters, paper filters, the results of the tests of which appear in Exhibit 27, compare in design with the filter Exhibit N.

A. The principle was the same. I am not sure about the exact details of the sizes.

The Court: Except that one side was large and the other side was smaller?

The Witness: That is right.

The Court: The entrance was larger and the exit was smaller?

The Witness: Yes, that is correct.

By Mr. Leonard S. Lyon:

Q. What would your answer be in a comparison with the filter, Exhibit C?

A. (Examining exhibit) Well, so far as I can see into it, it looks the same.

Q. And would it be the same in making a comparison with Plaintiff's Exhibit 16?

A. (Examining exhibit) Well, I don't know as to the relative sizes of these. There is quite a difference in [808] Exhibit 16 compares with the others, and of course there is differences in the paper, but it was of this general type of construction.

Q. Now referring to the first page after the photographs, I call your attention to a set of curves entitled "Figure 23. Dust Test Performance Curves for American Radiator Company Viscous Coated Paper." Are those curves a plot of the data you furnished to the railroads for this report on your

(Testimony of Frank B. Rowley.)

tests on the American Radiator Company paper filters?

A. Well, these are the curves they have plotted, and I assume they took it from those tests.

I noticed you called this viscous coated paper. It is viscous coated filter.

Q. Excuse me.

A. These are the curves purported to be on that type of filter in this report.

Q. These curves show the top curve, the filter efficiency that you obtained on the test with that particular filter?

A. That is correct. It shows the filter arrestance.

Q. And the bottom curve shows the pressure drop?

A. It shows the pressure drop resistance in inches of water; that is correct.

Q. Now can you tell us with what the paper was coated that was present in these filters during this test? [809]

A. No, I don't know what was on them.

Q. Did you put any special coating on it or did it come coated from the filter manufacturer?

A. It came coated from the factory.

Q. Will you read the initial pressure drop as you determined it on that test on that paper filter?

A. The initial drop is .15.

Q. And what was the final pressure drop at the end of 16 hours?      A. It is .42.

Q. And was the pressure drop curve substantially flat for the first six hours or so?

(Testimony of Frank B. Rowley.)

A. No, it was rising gradually from the—well, continuously. It curved upward throughout the test.

Q. Was there a change in that curve as you follow the time?

A. No abrupt change, no. It started flat and gradually curved upward.

Q. How much did it rise in the last 2 hours?

A. The last 2 hours?

Q. Yes. A. From .33 to about .42.

Q. How much did it rise in the next to the last 2 hours? A. From .27 up to .33. [810]

Q. How much did it rise in the third from the last 2 hours? A. From .22 up to .27.

Q. How much did it rise in the first 2 hours?

A. From .15—it is just a little under that—up to .16.

Q. How much did it rise in the second 2 hours?

A. About .16 to .17.

Q. Now how much faster was it rising in the last 4 hours than it was in the first 2 hours?

A. Well, between those figures I have just given it was rising faster.

Q. How many times faster? You have testified that it was rising gradually.

A. I would have to get the figures in mind.

The Court: What did it rise in the first 4 hours—what was it, a 16-hour test?

The Witness: Sixteen hours.

The Court: What did it rise in the first 8 hours?

The Witness: The first eight hours it went from .15 to .2.

(Testimony of Frank B. Rowley.)

The Court: That is five-tenths of an inch?

The Witness: Yes—five-hundredths.

The Court: Five-hundredths of an inch?

The Witness: Five-hundredths of an inch. [811]

The Court: Then in the last 8 hours?

The Witness: It was from .2 to .42.

The Court: So that it rose——

The Witness: About a tenth, a little over a tenth.

The Court: ——about four times as much, is that right?

A. The Witness: That is correct.

The Court: In the last 8 hours than it did in the first 8 hours?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Now under the title “Conditions of Test” on page 4 of this exhibit, there is a paragraph No. 1 titled “Test Apparatus. The test conformed with the American Society of Heating and Ventilating Engineers Standard Code and Apparatus for Testing and Rating Air Filters with the following exceptions: (a) The dust feeding apparatus which was developed at the University of Minnesota was substituted for that specified in the code.”

Now what was the difference in the dust that you used and that specified in the code?

The Court: He said the dust feeding.

Mr. Leonard S. Lyon: The dust apparatus.

The Witness: The dust feeding apparatus was one that we designed and are using at Minnesota.

(Testimony of Frank B. Rowley.)

The Court: That is the one you had a picture of here? [812]

The Witness: That is the one we had the picture of.

\* \* \* \* \* [813]

By Mr. Leonard S. Lyon:

Q. Now, it is stated in the next subparagraph (b), "The dust composition was changed in order to be more like that encountered in service. The mixture consisted of:

"1. Pocahontas Ash screened through 200 mesh screen, 50 per cent by weight.

"2. Germantown Lampblack screen through 100 mesh screen, 20 per cent by weight.

"3. Fullers' Earth screened through 100 mesh screen, 10 per cent by weight, and

"4. Fly ash screened through 200 mesh screen, 20 per cent by weight," adding up to a total per cent by weight of 100.

What was the reason for making that change and substitution of dust instead of using the dust specified by the Standard Code?

A. Well, when we started these tests, before we started them, the Association of Railroads called a meeting of all filter manufacturers at Chicago and they had about 20 representatives there of the various manufacturers, and at that meeting we discussed the type of dust, as close as we could get to it, that would represent a railroad dust, and everyone felt that 50 per cent carbon black was too much in the original loading, so they decided to put in

(Testimony of Frank B. Rowley.)

the Fullers' earth, 10 per cent, and 10 per cent fly ash, and then we [813A] had the Eagle Brand carbon black we were using, and that was the first time that that mixture had been used. But after these tests, it was decided that that was not a proper mixture, because it didn't give the filters the adequate chance for life, it shortened the life of practically all the filters.

The Court: You mean that type of dust?

The Witness: That type of dust, yes. That was the first time it had been used.

The Court: For practical use on a railroad, with coal-buring engines, don't you get a lot heavier dust?

The Witness: That is correct, you get heavy dust.

The Court: Cinders?

The Witness: Cinders. And another thing that was not present in this dust is the question of lint which is involved with the dusts.

The Court: You added lint?

The Witness: We added lints in all these tests.

The Court: But you did not get the ordinary service?

The Witness: Well, you did get it. We had so much lint, that was one thing we couldn't—

By Mr. Leonard S. Lyon:

Q. If you will look at Exhibit No. 27, you will find that none of the tests you have reference to carried the lint, that there are tests in here with separate curves where you [814] added the lint, so



(Testimony of Frank B. Rowley.)

maybe you better look at that before you make the statement that in all these tests you had lint present.

A. Wait a minute. I did not mean all the tests. I mean that was a part of the program, and the part we are referring to is the dust tests without the lint.

Q. Just the dust tests without the lint, but all these others, the reports of the lint tests, are in this Exhibit 27, are they not?

A. That is correct.

Q. But the ones I have called your attention to, asked you questions about, there was no lint present in those tests? A. No. That is correct.

Q. What dusts did you use in these tests on Exhibit NN?

A. I will have to look, on the curve.

In the Fig. 4 we used two types of dust. One was Pocahontas ash, between 200 and 325 mesh, and the other was Pocahontas ash screened through 325 mesh screen.

Q. That was a different dust than that which you used for the railroads? A. That is correct.

The Court: A finer dust?

The Witness: There are two type. It was screened. There were two separate dusts there, yes.

By Mr. Leonard S. Lyon: [815]

Q. I believe in discussing the matter of the railroads, you said that the dust you used gave the

(Testimony of Frank B. Rowley.)

filter a shorter life and hence you changed the dust.

A. That is correct. We felt that it gave the filter a shorter life and a higher, quicker rise in resistance, and we felt that it was not an adequate or a proper type of dust, so that is one reason that the research was continued on the types of dust for filters.

Q. Is the purpose of making a test such as you performed for the railroads to show a long life for a filter or to test the filter performance or filter performance characteristics?

A. No. My purpose in any test, in my opinion, is to test the performance of that filter as you expect it on the job, so you will know when you install it what to expect from the filter, and that is the reason why test dust is a very important question.

Q. What difference does it make, in performing such a test to determine the filtering performance characteristics of the device, whether it is a long life or a short life?

A. Well, that is a part of the performance characteristics. The length of life of the filter is one of the performance characteristics you are interested in.

Q. Then, the dust that you used for the railroad was the type of dust that would naturally give a low pressure drop, [816] is that right.

A. No. it was not, not necessarily, a low pressure drop.

Q. Well, a lower pressure drop than the dust that was called for by the Standard?

(Testimony of Frank B. Rowley.)

A. Well, no, I wouldn't say that it gives a lower than the Standard dust.

Q. Did you say something about the fact that this——

A. You mean a higher drop, don't you?

Q. What?

A. You mean a higher drop in pressure?

Q. Which would give a higher pressure?

The Court: By a higher pressure, do you mean that the curve goes up faster?

The Witness: I think that is what he means, a higher pressure drop.

The Court: I don't know.

Mr. Leonard S. Lyon: I am not sure that I know. We talk about how fast this curve goes up and we talk about how far it goes up.

The Court: Then, when you say "higher pressure drop" or "lower pressure drop"——

Mr. Leonard S. Lyon: I am not very clear about that myself.

The Court: Well, I am not. [817]

By Mr. Leonard S. Lyon:

Q. Which is the most significant in evaluating the performance characteristics of a filter, the total rise in pressure drop or the rate at which the pressure drop rises?

A. Well, I couldn't say that either one is more significant than the other. It is the difference between the beginning and the end, and if you used one rate, then, of course——

The Court: It is the rate at which it reaches the total, I suppose.

(Testimony of Frank B. Rowley.)

The Witness: That is right, which it reaches at the finish.

By Mr. Leonard S. Lyon:

Q. Are you familiar with the actual requirements of use that these filters have to meet in actual use?

The Court: Which filters? On the railroad filters?

Mr. Leonard S. Lyon: These impingement filters.

The Court: What is that?

Mr. Leonard S. Lyon: These impingement filters.

The Witness: You mean in an ordinary ventilating system?

Mr. Leonard S. Lyon: Yes.

The Witness: Well, I am familiar, yes, with the design conditions.

By Mr. Leonard S. Lyon: [818]

Q. Well, isn't it true that a rapid rise in pressure drop is the thing that must be guarded against, to prevent throwing the system off balance, rather than the final, total rise?

A. No.

Mr. Baldwin: I object. Your Honor, that statement "rapid" again is one of those vague speculations.

Mr. Leonard S. Lyon: I am talking about relatively rapid.

The Court: I think I understand that. The objection is overruled. The witness didn't answer.

(Testimony of Frank B. Rowley.)

The Witness: I said "No."

The Court: What you really mean is the rate of rise.

Mr. Leonard S. Lyon: That is correct, your Honor.

The Witness: It is the difference, the final difference that throws it off.

The Court: It is the final difference?

The Witness: It is the final difference. If you have a system designed that operates on a quarter-inch pressure drop and you put it up to a half, there is a little difference in there. Well, the real difference, of course, is between the quarter and the half. The way you get it doesn't of course make much difference.

The Court: If it gets there in an hour, it is worse than if it takes 20 hours, isn't it? [819]

The Witness: Yes. That is the total difference, however.

The Court: It is the total difference, but it is the rate which makes the utility of the filter.

The Witness: It does for the life, yes, that is true.

The Court: The life.

The Witness: Yes. I did not understand the question at first.

By Mr. Leonard S. Lyon:

Q. Following page 4 of Exhibit 27 is table No. 1, entitled, "Comparative Performance Data for Air Filters—Dust Test," and first there is a column headed "Type of Filter," and under that appear

(Testimony of Frank B. Rowley.)

the names "Air Maze," "American Air Filter," "American Radiator Co.," "Annis," Brillo Mfg. Co.," "Burgess," "Independent Air Filter," "Owens Illinois Glass," "Plymouth Cordage," "Safety Car Heating & Lighting," "Universal Air Filter," and "Wilson."

Then the next column is entitled "Thickness, inches"; and the next column is entitled "Initial Resistance, Inches of Water"; and the next column is entitled "Life in Hours"; and next column is entitled "Dust Fed In Grams"; the next title is "Dust Holding Capacity in Grams"; and the next title is "Overall Efficiency in Per Cent"; and then the next title is "Remarks."

Did you furnish that material to the railroads?

A. Well, these are the results from filter tests.

[820] They had all these filters, of course.

The Court: Well, you furnished the data?

The Witness: I furnished the data.

The Court: You conducted the experiments?

The Witness: And furnished them the data.

The Court: And furnished them the data, and they made up the tables?

The Witness: That is correct.

The Court: Are those tables correct according to your data?

The Witness: I don't know. I never checked them. I assume they are. I never checked them. They made them up with my data and sent them out.

(Testimony of Frank B. Rowley.)

The Court: Was it ever suggested that they "fudged" a little on it?

The Witness: No.

By Mr. Leonard S. Lyon:

Q. At page 8 of Exhibit 27, under the title of "Summary of Results from Laboratory Tests"—

The Court: What was that last page?

Mr. Leonard S. Lyon: That was Table No. 1, and I was following page 4. Then there are some other tables in here that I have skipped.

Q. There is the title, "Summary of Results from Laboratory Tests," commencing on page 8 of Exhibit 27, where [821] the following appears:

"The criteria by which the performance of the filters may be compared are (a) the life in hours, and (b) the efficiency in per cent.

"Table 1, page 5, shows the performance based upon these factors for the various filters using dust alone.

"Table 2, page 6, shows the performance based upon the same factors using the same dust composition, with the addition of approximately 10 per cent by weight of short wool fibers to represent lint.

"Table 3, page 7, shows the performance of two types of recleanable filters with various viscous coatings.

"The Appendix shows photographs and charts of the individual performance of the various filters based upon laboratory tests. Curves are included for each filter which show:

(Testimony of Frank B. Rowley.)

“(a) Resistance, which is the resistance to air passage interposed by the filter itself.

“(b) Arrestance, which is the percentage relation which the dust concentration to the leeward side of the filter bears to the dust concentration at the same point in the same system when operated [822] under identical conditions, but without the cleaning device. For all practical purposes this may be called efficiency.”

Now, as far as I have read, do you agree that those are proper statements of how to evaluate the filters, based on your tests?

A. As to arrestance and dust-holding capacity. Those are the factors you brought up.

The Court: Is that your language there which he read?

The Witness: No. That is their language. They are the writers of the report.

By Mr. Leonard S. Lyon:

Q. Do you think there is something wrong with it.

A. No. That is the way they wrote it up. I did not write that report.

Q. Well, are you content with it?

A. What? Well, I say it is not my language.

The Court: Was it true?

The Witness: What?

The Court: Is it true? Read it. Show it to him. Let him look at it.

The Witness: The first part of it.



(Testimony of Frank B. Rowley.)

The Court: Go ahead and look at it. Take your time.

The Witness: Where did you start on this?

Mr. Leonard S. Lyon: Right on this title, right here [823] (indicating).

The Witness: The first two statements there, "The criteria by which the performance of the filters may be compared are (a) the life in hours, and (b) the efficiency in per cent," I think those are correct.

The next four or five statements are just describing the report, which is satisfactory and correct.

Now, this statement (b) on page 9—yes, that is correct. It is just another way of stating arrestance or efficiency, I think.

The Court: All right, read that.

The Witness: Statement (b) says:

"Arrestance, which is the percentage relation which the dust concentration to the leeward side of the filter bears to the dust concentration at the same point in the same system when operated under identical conditions, but without the cleaning device. For all practical purposes this may be called efficiency."

That is correct.

The Court: What is the leeward side?

The Witness: The leeward is the downstream side.

The Court: And that is a correct statement?

(Testimony of Frank B. Rowley.)

The Witness: That is correct. It is another way of getting efficiency. [824-825]

The Court: All right.

By Mr. Leonard S. Lyon:

Q. The next statement in Exhibit 27 which appears on page 9 is:

“(1) Life in Hours

“The life in hours is the time required for the filter to reach a resistance of .40 inches of water with dust being fed at the rate of 20 grams per hour. The maximum limit of .40 inches of water was chosen because it was found by the air conditioning equipment tests that an external resistance in excess of .40 inches of water caused an excessive reduction in refrigeration capacity.”

Is that a correct statement?

A. Well, that is their statement and I assume it is correct. I did not determine that myself. They determined what that maximum resistance should be. I had nothing to do with determining it, but that is evidently a correct determination. They set it up.

The Court: Did you furnish them with all that information in connection with the refrigeration capacity?

The Witness: No. This was taken from the railroad operations.

By Mr. Leonard S. Lyon:

Q. The next statement under this paragraph is headed: [826]

(Testimony of Frank B. Rowley.)

“Overall Efficiency in Per Cent.

“The overall efficiency is that per cent of the total dust fed into the air stream that is retained by the filter.”

Is that a correct statement?

A. Yes, that is correct.

The Court: Now, wait. Would you say that when the inches of pressure reaches—what was that, .4?

Mr. Leonard S. Lyon: .4.

The Witness: .4.

The Court: (Continuing) —.4, from your experience, in testing these filters, that they should be cleaned?

The Witness: I would think that they should be cleaned at .4 or thereabouts.

The Court: Or thereabouts?

The Witness: Yes.

The Court: And that any use of them after that would result in a rapid loss of efficiency?

The Witness: It probably would, because it would probably drop in efficiency and the pressure would probably go up pretty fast.

The Court: I see.

By Mr. Leonard S. Lyon:

Q. Paragraph (3) is entitled “Rating of Filters Based Upon Performance Factor”: [827]

“The relative performance of the various filters based upon laboratory data should consider both the life of the filter and its overall efficiency. For all practical purposes, the product of the life in hours and the efficiency in per cent will give a

(Testimony of Frank B. Rowley.)

hypothetical value that may be called the 'performance factor' of the filter. Such a performance factor is a useful method whereby the various filters may be rated according to their performance under laboratory tests."

Do you agree with that statement?

A. Well, that is the general statement covering a method, of course, of getting the performance satisfaction. That is two factors put together, two to determine the one.

The Court: That is, the pressure drop and efficiency rating?

The Witness: That is right, that is the two factors. They multiply them together and call that a factor.

The Court: Then you multiply that to get the final performance?

The Witness: That is right.

By Mr. Leonard S. Lyon:

Q. Then, the final statement, on page 10, (4), says:

"Cost Factor of Filters"

And continues: [828]

"In making a choice of the best and most economical filter to use, there is another factor that must be considered in addition to the life and efficiency. This factor may be called the 'cost factor,' and should consist of three items:

"(a) The initial cost of filter per number of times used, or the initial cost per service period.

"(b) The maintenance cost per service period.

(Testimony of Frank B. Rowley.)

“(c) The additional charge per filter per service period due to the investment in cleaning facilities.”

Then follows the “Expressed by formula,” and I am not going to read the formula. I will show it to you.

Do you agree with that statement which I have read, under the title, “Cost Factor of Filters”?

A. I think this sums up the cost factor all right—it is one way of summing it up.

Mr. Leonard S. Lyon: Your Honor, it is 4:00 o'clock. I move to adjourn.

The Court: Very well.

Do you expect to make any tests or produce any data of tests on the two filters here that are in suit, where the identical dust is used and the identical rate of flow of air?

Mr. Leonard S. Lyon: I don't know. [829]

The Court: You have done it with the Duncan dust at 519 feet per minute, but you haven't done it with the Duncan dust at 300 feet per minute and you haven't done it with the Pocahontas dust at 519 feet per minute.

Mr. Leonard S. Lyon: We are going to produce some tests that were made back in 1942 or 1943 by the Farr Company for the railroads, which I think the witness will consider comparable to the tests that he made, and they were made on the Farr filter.

The Court: Yes. Well, I am asking merely whether or not you are going to make any tests

(Testimony of Frank B. Rowley.)

here, because, as the matter now resolves itself, I have to make a determination as to whether or not these different dusts are comparable, I have to do the correlating, which could be done perhaps by experiment, between the different dusts at the different speeds.

Mr. Leonard S. Lyon: We will be glad to make any tests that would be helpful to the Court. The only thing is that it is indicated that it takes 20 hours or so for one of these tests.

The Court: Well, you have about 72 hours between now and Tuesday. [830]

\* \* \* \* \*

Mr. Baldwin: If the Court please, a test was made, according to your Honor's instructions, over the week end out at the Farr Company, and we are having some charts drawn up on the data which Professor Rowley gathered during that test.

The Court: He was present during the test?

Mr. Baldwin: He was present as often as he could be, which was quite a number of times, and we would like to reserve the right, if we finish with Professor Rowley before those charts are available, to have the right to put him on when they are available.

The Court: Before your charts are available?

Mr. Baldwin: Yes, if they finish with him here before our charts are available, we would like to have the right to call him back.

Mr. Leonard S. Lyon: Your Honor, at the adjournment Friday afternoon, having in mind

(Testimony of Frank B. Rowley.)

your Honor's query as to whether any tests could be made to eliminate this problem of correlation, Mr. Duncan and Professor Rowley conferred and agreed upon what they thought would be the best test, which [835] was started on Friday night and which was finished at 8:00 o'clock this morning, and we have reduced the data to the regular form of curves that are being used here.

The Court: Charts, please. I don't like to get "curves" mixed up in a law suit.

Mr. Leonard S. Lyon: Well, Professor Rowley was there and had access to the data, and I think that the best order would be for us, on our rebuttal, to put that test on with Mr. Duncan, if he will produce the curves——

The Court: Charts.

Mr. Leonard S. Lyon: ——and if they find anything wrong with them, of course I have no objection to them, after that, having an opportunity to produce any curve they have.

Mr. Harris: We will have our own curves, in any event, I am sure.

Mr. Leonard S. Lyon: At this time I would like to offer in evidence Plaintiff's Exhibit No. 27 for identification. This is the report of the Association of American Railroads, that I examined the witness on.

Mr. Baldwin: We object, your Honor. It is all hearsay. There has been no evidence adduced as to who prepared it or where it came from. We object.

The Court: The witness testified that he con-

(Testimony of Frank B. Rowley.)

ducted the tests, that he submitted the data, and that he had not only no reason to believe that it was not accurately reported, but [836] had every reason to believe that it was accurately reported. The objection is overruled.

Mr. Baldwin: Those were not his statements, your Honor. He said that the data was not submitted to him and he did not check it.

The Court: That he submitted the data to them.

Mr. Baldwin: That he submitted the data to them, and he doesn't know what they did with it after that. He just said he didn't want to accuse them, the American Railroads, of crookedness, that is all.

The Court: I did not so understand his testimony. I understood him to say that, in effect, he had no reason to doubt that it was accurately reported and that he believed it was. Isn't that correct?

The Witness: Yes. I had no reason to doubt it. As has been stated, it wasn't recorded by me. I sent the tests in and they recorded it and they wrote the report.

The Court: The objection is overruled. It will be admitted in evidence.

(The document referred to, marked Plaintiff's Exhibit No. 27, was received in evidence.)

Mr. Leonard S. Lyon: May I have Exhibit PP?

(The exhibit referred to was passed to counsel.)



(Testimony of Frank B. Rowley.)

Mr. Leonard S. Lyon: Then I would like to have Exhibit 15-B, the plaintiff's exhibit.

(The exhibit referred to was passed to counsel.)

Cross Examination (continued)

By Mr. Leonard S. Lyon:

Q. Referring first to Exhibit PP, what is represented by the holes in this exhibit?

A. The holes in Exhibit PP represent the points of contact between the corrugations that run in opposite directions, the corrugated screens where they contact.

Q. I hand you Exhibit 15-B, and ask you if you can point out to the Court on Exhibit 15-B the points of contact which are represented by the holes on Exhibit PP.

A. Yes. The points of contact on Exhibit 15-B are the points where these screens come together. As we follow through the corrugated section of the top and bottom, they are in contact, and those contact points represent the points where the metal didn't close and represent the holes in here. That is, the solid metal represents these cavities.

The Court: Spaces.

The Witness: Spaces. And the holes are points of contact with the screen.

The Court: Did you drill these holes? [838]

The Witness: No, they were cast and when they were cast in there the metal didn't flow in there, it stopped.

(Testimony of Frank B. Rowley.)

By Mr. Leonard S. Lyon:

Q. Now does not the contact between each one of these points represented by those holes in Exhibit PP divide the structure along the vertical dimension normal to the flow of the air through the filter?

A. No, I wouldn't say those points of contact divide it.

Q. They dissect it, do they not?

A. No, they don't dissect it either.

Q. They extend through it vertically, do they not?

A. It goes through from one to the other.

Q. It goes through from one horizontal subdivision to the adjacent horizontal subdivision, does it not?

A. Yes.

Q. And in that sense it bisects vertically the structure, does it not?

A. No, it does not.

Q. What does it do?

A. Well, it simply supports one screen on the other. You say dissect. That means divide into two parts.

Q. I mean it forms a solid member extending vertically between the two horizontal members, does it not?

A. No, it does not. [839]

Q. It does not?

A. No.

The Court: Let me see that.

(The exhibits referred to were passed to the Court.)

The Witness: Not vertically. It is simply point to point.

(Testimony of Frank B. Rowley.)

By Mr. Leonard S. Lyon:

Q. Well, there is a solid metal member, a continuous member formed by the contact at that point, is there not, a vertically continuous member?

A. No.

The Court: It would not be quite vertical, would it? It would go down across that way.

Mr. Leonard S. Lyon: Angular.

The Witness: No, it doesn't run vertically. Actually you have two things supported together at a point.

By Mr. Leonard S. Lyon:

Q. They form a continuous member, do they not?

A. Those points don't form a continuous member.

Q. They form a structure, a vertical structure, around which the air has to flow. It can't flow through that, can it?

A. It can't flow through that point if it is in contact.

Q. And therefore at each one of these holes [840] represented on Exhibit PP there is a metal contact which subdivides the air?

A. Well, there is a metal contact where those screens touch each other.

Q. Yes, and the air has to flow around that.

A. It couldn't flow through the contact point.

Q. That is right.

The Court: Assume that you took—what is that P-5 exhibit, the defendants' number, the 20 x 20 screen?

(Testimony of Frank B. Rowley.)

Mr. Leonard S. Lyon: Exhibit 12, I believe.

(The exhibit referred to was passed to the Court.)

The Court: Assume that you cast that hole 20 x 20 filter with metal such as this one and then you took it out, would these series of holes go right from top to bottom all the way through?

The Witness: The series of contact points and these crossing points with one over the other, one to the next.

The Court: In other words, if you cast that whole thing and were able to take it out you would find these series of holes going from top to bottom?

The Witness: Yes.

The Court: Assume that you cast Exhibit 12, the screen, what is now the screen material, assume that were in solid metal and the places here where there are holes now were free, then you would have an air opening from top to bottom, [841] would you not?

The Witness: No. This lead represents the air opening and the openings in that lead represent where the one layer contacts the other, where the corrugations cross.

The Court: Assume that the screen material in that Exhibit 12 were made out of solid metal, there would not be any way for the air to flow through the screen except through these zigzag openings and it could not go from one layer of metal to the other, could it?

(Testimony of Frank B. Rowley.)

The Witness: No, not from one layer vertically. It goes laterally but not vertically—horizontally.

The Court: You mean it could go from one end of it to the other?

The Witness: Sideways, horizontally, one side to the other.

The Court: Very well.

By Mr. Leonard S. Lyon:

Q. But it would have to divide up into fillets to go from one channel to another because it would have to go around these points of contact that you have indicated, isn't that correct?

A. They wouldn't divide up into fillets, they would just flow across the sheet.

Q. But these points of contact would divide that air in a horizontal flow? [842]

A. They wouldn't, they would have to flow around the points.

Q. That is what I mean. It would have to flow around those contact points and they would divide the air into multiple streams, would they not?

A. No, it would be one stream and each time a stream came into one of those contacts it would flow around. It wouldn't be the same stream.

Q. It would be the same as a screen?

A. What is that? I said stream, the same stream.

Q. But it would be divided by those points of contact?

A. The stream would just flow around it. It would be one stream.

Q. Part of the stream would go around one side

(Testimony of Frank B. Rowley.)

of the contact and part around the other, would it not?

A. Yes, and then when it came to the next contact there would be another part going around.

Q. And the contacts would continuously divide that stream?

A. No, they wouldn't continuously divide the stream.

Q. They wouldn't divide the stream?

A. Not continuously.

Q. Would they divide the stream as the stream reached each contact point of the screen? Would it have to flow around one side and part around the other? [843]

A. That is correct, but it wouldn't divide the stream.

Q. Then, as a matter of fact, the air flow through the screen at the planes shown by Exhibit 15-B is divided both horizontally and vertically into passages, is it not?

I will ask that the question be reread so you will be sure to get it.

(The question referred to was read by the reporter as follows:

("Q. Then, as a matter of fact, the air flow through the screen at the planes shown by Exhibit 15-B is divided both horizontally and vertically into passages, is it not?")

The Witness: No, it isn't.

(Testimony of Frank B. Rowley.)

By Mr. Leonard S. Lyon:

Q. Is it divided both horizontally and vertically? A. No, not divided horizontally.

Q. What do you mean, it is not divided?

A. I mean it is not divided.

Q. Doesn't the air through the P-5 filter in going either horizontally or vertically have to pass around these points of contact and the screen wire?

A. It passes by those points wherever the contacts are.

Q. And they are both vertical and horizontal points of contact, are they not?

A. Well, there are points where the two alternate [844] layers of corrugated material contact.

Q. And whether the air was flowing either horizontally or vertically it would have to pass around the points of contact in the device, is not that right?

A. It would pass around, wherever they come to a point they couldn't flow through the contact.

Q. But the point is, there are such points of contact both vertically and horizontally in the device?

A. Those contacts, as I explained, are just the points where the screen, the corrugation, touches, where one corrugated screen touches the other.

Q. Yes, but there are contacts in the P-5 filter so that the air cannot flow either vertically or horizontally without passing around those points of contact, isn't that right?

A. Yes, but that doesn't mean the stream is divided.

(Testimony of Frank B. Rowley.)

Mr. Leonard S. Lyon: I think that is all, your Honor.

The Court: I would like to ask the witness a question in connection with Exhibit J, which was the path of air flow chart.

The Witness: Yes, your Honor.

The Court: While the path of air flow, if I understand your testimony correctly, is not as illustrated by Exhibit J, but that after the air enters it goes and flows horizontally in each one of these places where they are points, is that [845] correct?

The Witness: No, that is not my testimony as I wanted to state it.

This Exhibit J shows possibilities for the flow of air entering.

The Court: It does not show them all though, does it?

The Witness: It shows only one path, one stream of air entering the filter and shows how that might divide up.

The Court: If I understand your testimony correctly, from this Exhibit PP the air can come in and at the first point of contact and in each one of these it flows horizontally as well as going straight ahead.

The Witness: The point is that it could. There is a path horizontally, not divided. Naturally the air coming in all along here would prevent this spreading in these directions. There are streams of air coming in each one of these entering cells, and



(Testimony of Frank B. Rowley.)

naturally they carry on through the filter and this stream of air, while it has a path and opening through here which isn't subdivided, it will follow this course. What would happen—— [846]

The Court: Each one of these, then, how would they get into the other stream of air?

The Witness: Well, they mix. If we take this stream that is shown here and then come over to the left or right with another stream of air, then there would be a second stream coming, splitting right there (indicating), and this part, the left part of the one I am drawing with the pencil, would mingle with the right-hand part of that stream and form these two down in here and mix.

The Court: Would not this mingle with that and go on down there?

The Witness: That is right, it would go all the way down, it mixes. It goes in and it might go any distance across here (indicating), in the general direction, but it would mingle clear across.

The Court: So it goes across that way and horizontally as well?

The Witness: That is right. There is no subdivision horizontally.

The Court: All right. Redirect.

### Redirect Examination

By Mr. Baldwin:

Q. Professor Rowley, you recall Exhibit Ll., which was the French filter, the dirty one?

A. Yes. [847]

(Testimony of Frank B. Rowley.)

Mr. Baldwin: I just want to straighten out one or two things in the record, as we go along.

The Court: All right.

Mr. Baldwin: In the transcript, at page 634, I will read a colloquy between you and the Court.

The Court says:

“The Court: That is, seven by seven?”

“The Witness: It is actually six by six, inside.

“The Court: Six by six inside?”

“The Witness: That is right.

“The Court: You did not fill the outside of that with paraffin?”

“The Witness:” —

This is what it says in the record——

“We did in here, yes, around in here. We did on this window but we did not on the sides.”

Q. Is that what you intended?

A. No. That is just the reverse. We filled in around the solid metal part, but not over the window.

The Court: I so understood you at the time.

Mr. Baldwin: The record just happened to be the opposite. The word “not” got in the wrong place.

There is another place in the record, at page 638, which carries over from a series of questions on page 637, in the middle of page 637 is a question respecting Exhibit LL again, and the following question about Exhibit MM, which was the [848] data plotted from the French panel LL. I just want to get him in the right place.

(Testimony of Frank B. Rowley.)

And then you, in response to a question from me:

“Does the fact that the resistance rose at the end of 14 hours to .44 inches of water indicate that this filter should be classified as an unsatisfactory filter?”

“A. No.

“The Court: What does it indicate?”

“The Witness: Well, it indicates the pressure rise.

“The Court: Well, but I mean insofar as its utility is concerned.

“The Witness: Well, it indicates that it is a practical filter, because it has a rather high efficiency, but also we know that, as far as the filter is concerned, we could change the screen in here and put in a little bigger screen and we would have a little greater resistance. You see, we have a very fine screen there.”

Q. Is that what you intended to say?

A. No. I intended the reverse. It would be with less resistance with the bigger screen.

The Court: With the bigger screen?

The Witness: Yes. [849]

Mr. Baldwin: There is just one other place which I don't call attention to as being anything incorrect in the record, but beginning at the top of page 639 and down to line 17 of page 640, there was an exchange of questions and answers between the court and the witness, and I will start at the bottom of page 638:

“The Court: Then, when you want to take out

(Testimony of Frank B. Rowley.)

a hundred per cent, you use the spun glass, is that right?

“The Witness: That is one way of getting it out, but that is a very high resistance and you have to change there.

“The Court: Well, it starts out with a high resistance, doesn’t it?

“The Witness: Yes.

“The Court: It would have to?

“The Witness: It would have to, to take it out.”

Is there any objection, counsel, if the record shows that the colloquy down through line 17, page 640, related to that spun glass filter? I think the record is not clear. That is all. I can read the whole thing.

Mr. Leonard S. Lyon: The record beginning where?

Mr. Baldwin: At the top of page 639.

Mr. Leonard S. Lyon: 639?

Mr. Baldwin: And extending to line 17 of page 640. [850]

Mr. Leonard S. Lyon: I don’t know. The Court’s question at the top of page 639 says:

“The Court: Well, it starts out with a high resistance, doesn’t it?”

And I do not know. If we go back for an antecedent for that, it would appear that the Court is talking about Exhibit LL.

Mr. Baldwin: Well, that is what I want to correct. I can read the whole thing and ask the witness, and I better do it, I guess.

(Testimony of Frank B. Rowley.)

Mr. Leonard S. Lyon: I don't think the witness can construe it. I think that is a matter for the Court, because there is no question but what this is a correct transcript.

Mr. Harris: There is a question of what the witness meant. I think the witness should be straightened out right here and now, if counsel has that impression of the record.

Mr. Leonard S. Lyon: Well, I am not sure that the witness is straightening it out. He may putting a "curve" in it.

Mr. Baldwin: Well, the court was conducting the examination.

The Court: I think that is reverting back to Exhibit LL.

Mr. Leonard S. Lyon: Yes.

The Court: The witness was explaining the Exhibit LL and he said, "Furthermore, the filter will have to be designed to take out dirt, and when you do that you are going to have a higher resistance filter. It is a different construction, [851] a different type.

"The Court: Then, when you want to take out a hundred per cent, you use the spun glass, is that right?

"The Witness: That is one way of getting it out, but that is a very high resistance and you have to change there.

"The Court: Well, it starts out with a high resistance, doesn't it?"

(Testimony of Frank B. Rowley.)

And I am quite sure I was referring to Exhibit LL.

Mr. Baldwin: MM.

The Court: Well, MM, whatever it is. MM is the chart. Here is MM (handing said exhibit to the witness). Wait a minute. Let me see the rest of it now.

By Mr. Baldwin:

Q. Professor Rowley, when the Court asked you, as shown in the transcript near the top of page 639, "Well, it starts out with a high resistance, doesn't it?" referring to Exhibit MM, would you say that that starts out with a high resistance?

A. No. This starts out with a low resistance and builds up, Exhibit MM.

Q. And what were you referring to when you said it starts out with a high resistance?

A. Well, I was referring to those glass filters, those positive, absolute filters, because we have to have a high resistance on those in order to be sure that we are getting all the dirt out with that filter. I was confused with the [852] Court's question, when answering that.

Q. I will read to you a statement from the middle of page 639. This is quoting the witness; the court, first:

"Did you test that on your spun glass filter?" That is line 12.

"The Witness: Not exactly on that basis. We expanded the area. But if you tried to carry the air

(Testimony of Frank B. Rowley.)

through that filter at this 300 feet, it would have a very high pressure drop."

What did you mean when you said "that filter"?

A. I meant the absolute filter.

The Court: The spun glass?

The Witness: The spun glass. If we put that in series with this or used that to take out all of the dust, as a perfect filter, and tried to pass the air through that spun glass, the absolute filter, at 300 feet a minute, it would be a very high pressure drop, is what I was trying to explain there.

By Mr. Baldwin:

Q. And calling your attention to your answer, line 16 on page 639, the witness stating, "It would be impractical for any air-conditioning system, to use that kind of a filter.

"The Court: Because of the high pressure drop?

"The Witness: Because of the high pressure drop and then because of the cost and everything else. [853]

"The Court: You mean the cost of the original installation or the cost of forcing the air through them?

"The Witness: Both."

To what filter were you referring?

A. I was referring to this absolute glass, the positive filter.

The Court: Wouldn't you give the same answer as to this?

The Witness: No.

The Court: You gave a "high pressure drop"

(Testimony of Frank B. Rowley.)

in giving the answer with respect to cost of installation and cost of forcing the air through?

The Witness: It isn't. It is low to start with.

The Court: I know, but it drops at the end of 14 hours. It runs up to .45?

The Witness: Well, but the point is, it could be cleaned any time in here. Then it would be down. This pressure drop is nothing like the pressure drop of that absolute filter that we talk about. It is of entirely different magnitude.

The Court: I see. That is set forth in this American Railroad magazine?

The Witness: No.

The Court: The Owens-Illinois glass filter?

The Witness: No. That is a different type of filter [354] entirely. That is a different type of glass filter. That isn't the positive, absolute filter that is shown in there.

The Court: All right.

By Mr. Baldwin:

Q. I call your attention to the transcript at the top of page 640:

"The Court: You would have to put fans or suction pumps or something in it to get air in it?

"The Witness: You would, or else you would have to have a very large area of the filter if you were going to force the air through with anything like 300 or 500, you would have to have very large fans."

To which filter were you referring.

A. That is the positive filter.



(Testimony of Frank B. Rowley.)

Q. Made of spun glass?

A. Made of fine spun glass that we use for the absolute filter.

Q. I hand you Plaintiff's Exhibit No. 27 and I read to you from the transcript a question you were asked on cross examination, reading from page 786 of the transcript, line 5:

“Q. Well, you would say, would you not, that the pressure drops for the Air-Maze Type B filter, as shown both in your Figs 6 and 7 of Exhibit 27 and on the curve for the Air-Maze Type B shown on Exhibit 11, were both relatively high at the end of the test as [855] compared with the pressure drop that you have covered with reference to the Air-Maze P-5 filter?”

I ask you to examine Exhibit 27 and state what type of Air-Maze filter was involved in the tests of Exhibit 27, if you can find them.

A. Well, the Air-Maze filter involved in Exhibit 27 is described on page 16.

Q. Would you read what it says, please?

A. Reading that description, “Manufacturer: Air-Maze Corporation. Type of Filter: Air-Maze Type A.”

Q. I can't find the page number in the record, but at the bottom of page 827 of the transcript you were asked this question:

“Paragraph (3) is entitled ‘Rating of Filters Based Upon Performance Factor.’

Can you find that in Exhibit 27? Paragraph (3)?

(Testimony of Frank B. Rowley.)

A. That refers to the exhibit, page 10.

Q. Page 10, you say? [856]

A. It starts on page 9, paragraph (3), based upon the performance factor.

Q. If you were read this statement, perhaps you can follow it in the exhibit (I am quoting from the top of page 828 of the transcript):

“The relative performance of the various filters based upon laboratory data should consider both the life of the filter and its overall efficiency. For all practical purposes, the product of the life in hours and the efficiency in per cent will give a hypothetical value that may be called the ‘performance factor’ of the filter. Such a performance factor is a useful method whereby the various filters may be rated according to their performance under laboratory tests.”

Did you write that language, Professor Rowley?

A. No.

Q. Does that represent a usual criterion for filters? A. No.

The Court: Did it at that time?

The Witness: No. This is the only place I ever saw this quoted, or that performance factor used. By Mr. Baldwin:

Q. Who got up that performance factor which is mentioned in that paragraph? [857]

A. This was somebody with the Association of American Railroads, in their office. I don't know who got it up. That is, I assume that.

(Testimony of Frank B. Rowley.)

Q. Turn to page 12 of Exhibit 27 and read paragraph (5).

A. Paragraph (5) reads:

“Overall Performance of Filters.

“The overall performance of a filter is based upon the life and efficiency of the filter divided by its cost factor. It is only necessary for a railroad to divide the product of life and efficiency as determined by laboratory tests by the cost factor that is applicable to its own conditions in order to determine the most practical type of filter for its particular service.”

Q. What does that mean to you, Professor Rowley?

A. That means you have to take these other two performance factors and consider the cost factor of the filter, the original cost and the operating cost, or whatever enters into the cost of handling that filter. That has to be taken into consideration in order to determine the type of filter that they ought to select.

Q. Who selected the dust for those American Railroad tests that you made in 1937, reported in Exhibit 27?

A. That was a joint selection by the representatives [858] of all the filter manufacturers. There were about 20 representatives that met, and I met with them, in Chicago and we discussed it, and that was the result of that discussion.

Q. Who determined the purpose of the tests and——

(Testimony of Frank B. Rowley.)

The Court: I thought you said the railroads provided some of the dust.

The Witness: I mean the Railroad Association. I want to make that clear. This question now was who selected this type of dust.

The Court: Who selected the dust that was used in the filters. I thought you said on direct examination or cross examination that the railroads selected the dust because they had particular and peculiar conditions.

The Witness: I think that I didn't make myself clear. What I meant was that this group, the railroad officials, the authorities, and the filter manufacturers jointly selected the type of dust. I probably didn't make that clear.

\* \* \* \* \*

By Mr. Baldwin:

Q. I hand you an exhibit marked for identification as Defendants' Exhibit VV and ask you if you can identify it.

A. Yes, I can [859]

Q. What is it?

A. It is an addition to Plaintiff's Exhibit 13, a photostated copy of Plaintiff's Exhibit 13, and the red lines on that exhibit represent, first the lower curve, which is the pressure rise across the filter in inches of water, and the upper red curve, the curve drawn in red, represents the efficiency. Those curves were taken directly from the test data, part of which I observed over the week end, Friday,

(Testimony of Frank B. Rowley.)

Saturday, Sunday and Monday, and this is the result.

The red graph shows the results of a test which was performed by Professor Duncan or under his direction, his laboratory men, at the Farr plant over the week end.

The Court: On what?

The Witness: On a Farr filter, the same filter that the other data was taken, according to his statement. The only difference between the two sets of curves was the test dust.

Now the red curves were determined by using a dust which was 80 per cent Pocahontas ash and 20 per cent carbon black as selected in their laboratory from some stock they had. Those curves represent the differences that were obtained in these two tests.

The Court: Very well.

By Mr. Baldwin:

Q. And as to the points on the pressure drop curve shown in the red line, how did you obtain that data? [860]

A. I visited the laboratory several times—I was down there six times during the period—and I went over their charts, I talked it over and I actually read many of those points, and they furnished me with the others that I didn't read because they had their laboratory men continuously on the test.

Q. Did you plot that pressure drop curve from the data which you personally read and which they gave you? A. Yes, I did.

(Testimony of Frank B. Rowley.)

Q. And how did you obtain the data for the efficiency curve?

A. The efficiency curve I obtained from their data. Their test apparatus is set up so that the sampling is automatic, and I took their samples and their efficiency figures because I couldn't calibrate those, but I assume they are all right.

Q. I wish you would again enumerate the differences between the conditions under which the curves of Exhibit 13 were plotted for the Farr filter and the conditions under which the red lines were plotted for the same Farr filter.

The Court: I understood him. He said they were identically the same except that he used 80-20 dust.

The Witness: That is correct.

Mr. Baldwin: I beg your pardon.

The Court: That the rate of flow and everything else was [861] the same.

The Witness: Everything was the same, so far as I know.

The Court: Did you conduct any tests there of this standardized fine air cleaner test dust No. 1543094 at the rate of 300 feet per minute on the P-5 filter?

The Witness: No, we haven't done that. We didn't have any facilities for it. The test apparatus was tied up completely for this period.

The Court: Very well.

Mr. Baldwin: I offer Exhibit VV in evidence, your Honor.

The Court: Admitted.

(The document referred to was received in evidence and marked Defendants' Exhibit VV.)

[Printer's Note: Defendants' Exhibit VV is reproduced in Book of Exhibits.]

Mr. Baldwin: That is all.

Mr. Leonard S. Lyon: No questions. [862]

\* \* \* \* \*

RICHARD EVERETT BROWN

called as a witness by and on behalf of the defendants, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Richard Everett Brown.

The Clerk: And your address?

The Witness: 17108 Invermere Avenue, Cleveland 28, Ohio.

The Clerk: Will you spell that name?

The Witness: I-n-v-e-r-m-e-r-e.

Direct Examination

By Mr. Baldwin:

Q. Will you please state what your education has been, Mr. Brown?

A. I was educated in the public schools in Cleveland, Ohio, and attended Case Institute of Technology in Cleveland, and graduated from there in 1942 with a bachelor of science in mechanical engineering. At the present time I am a registered professional engineer in the state of Ohio.

Q. Would you please state what your work experience has been since you left——

(Testimony of Richard Everett Brown.)

The Court: Registered professional engineer?

The Witness: Yes, sir.

The Court: Out here we have all kinds of engineers. [863] What kind of an engineer are you, a civil engineer?

The Witness: A mechanical engineer.

By Mr. Baldwin:

Q. Will you please state your work experience since you left school?

A. After I graduated from Case I was hired by Air-Maze Corporation and for about the first three years worked in the test and development department as a test and development engineer.

After that time I moved to the product engineering department and in 1948 I was made assistant chief engineer of Air-Maze.

Q. Is that your present position?

A. That is my present position.

Q. Would you state whether or not you have ever tested air filter panels?

A. Yes, I have tested air filter panels. I tested them during the first three years when I was a test and development engineer, and I supervised the testing of all the air filter panels that are tested in our testing development department.

Q. Will you describe briefly the filter panel testing apparatus and procedure that Air-Maze Corporation has?

A. We have several sets of apparatus for different types of test. For viscous impingement type



(Testimony of Richard Everett Brown.)

filters, it [864] would probably be best to start at the air intake end.

The air is drawn first through a positive filter of fiberglass, spun fiberglass, so as to reduce or minimize the possibility of outside dirt upsetting test conditions.

Then the air is drawn through a dirt, automatic dirt, feeder, and then through the 6 x 6 test section of the filter to be tested, and then through the positive filter that is used for determining the efficiency of the filter panel, then thorough a flow controlling valve, then through a flow metering orifice and to a blower. The blower that we use is of very high pressure drop so we can pull all of the air through the various resistances in the system.

When the panels are prepared for test the frames are waxed and——

The Court: Let me follow you. You test a 6 x 6 panel?

The Witness: Yes, sir, 6 x 6 net area, so it is a quarter of a square foot.

The Court: In other words, it is what they call a 7-inch panel?

The Witness: That is right. We wax in half an inch of the enclosing panel.

The Court: And that test panel is set between two absolute filters?

The Witness: The primary purpose for the first——

The Court: Is that what is done? [865]

The Witness: Yes, that is correct.

(Testimony of Richard Everett Brown.)

The Court: Set between an absolute filter at the intake and then one beyond it on the outflow?

The Witness: That is right, with the dirt feeder ahead.

The Court: And the air is introduced by suction?

The Witness: That is correct.

The Court: At the end?

The Witness: That is correct.

The Court: Go ahead.

The Witness: The filter is waxed in the enclosing channel so as to minimize each effect and extra viscous coating running down from this channel onto the media. We are primarily interested in testing a media so that we can compare and reproduce results.

After the panel has been prepared by waxing and dipping in the viscous coating, which in our test work is either S.A.E. 30 or S.A.E. 40 oil, and we make it different on the various types of panels for the class of service in which it will go.

The system is all set up with the positive filter in place. Air is drawn through the system for 10 minutes so as to minimize the humidity effect.

The Court: With the positive filter in place?

The Witness: With the positive filter in place, in the two sections. [866]

The Court: I understand.

The Witness: After the air has been drawn through for 10 minutes the positive filter downstream from the test filter is removed and weighed.

(Testimony of Richard Everett Brown.)

It is weighed on a chemist balance so a very accurate weight can be made.

The filter, this positive filter, is then replaced in the test equipment, the air flow started and then the dirt, the artificial dirt, is introduced into the system.

The weight of dirt being fed into the system is again weighed on a chemist balance so that the weight will be accurate.

The dirt is fed for a 1-hour time period and the pressure drop or resistance readings are taken every 10 minutes.

After the end of the hour the positive filter downstream from the test filter is removed and weighed. All of the dirt that does not reach the test filter is swept from the duct and deducted from the amount of dirt that is figured as being fed into the filter.

For example, if we had 10 grams artificially fed into the filter and 1 gram was in the duct upstream from the filter, we would consider 9 grams as being the amount of dirt fed into the filter.

The efficiency is then determined by a difference in weight of the positive filter before and after the 1-hour dust feed. [867]

The Court: Downstream filter?

The Witness: The downstream filter, that is right.

And divided by the amount of dirt fed into the panel.

(Testimony of Richard Everett Brown.)

By Mr. Baldwin:

Q. How long has this apparatus and procedure been used by Air-Maze Corporation to your own personal knowledge?

A. Well, the equipment as it is now has been, with a few minor exceptions such as an improving the method of feeding the dirt, the same as it was before I got there, before I was hired.

Q. And it has been used in exactly its present condition for how many years?

Mr. Leonard S. Lyon: He can only testify since he has been there.

By Mr. Baldwin:

Q. Of your own knowledge.

A. In its improved condition, the way it is actually now?

Q. Yes.

A. It has been in use now about seven years.

Q. Are you familiar with the Kaiser patent, No. 2,019,186?      A. Yes, I am.

Q. Have you ever seen a filter constructed according to this patent? [868]

A. Yes, I have.

Q. Have you ever seen a filter constructed like the Kaiser patent but out of screen mesh materials?      A. Yes, I have.

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit WW.

(The device referred to was marked Defendants' Exhibit WW for identification.)

By Mr. Baldwin:

Q. I hand you a device marked for identifica-

(Testimony of Richard Everett Brown.)

tion Defendants' Exhibit WW and ask you if you can identify it.       A. Yes, I made this myself.

Q. Describe the structure there.

A. Well, it is made up of alternate crimped and flat layers of 14 mesh galvanized screen cloth. It is made up in what we would call two pads, the crimp and flat section on the approach face pad goes diagonally down and the crimp and flat section of the back pad goes diagonally upward relative to a vertical center line. The two pads are separate and space from each other by metal strips.

The Court: Solid metal?

The Witness: Yes, down the edge of the enclosing channel. In other words, each one of these is a separate pad that can be removed individually.

The Court: Let me see it. [869]

(The exhibit referred to was passed to the Court.)

Mr. Baldwin: There is a window on one side, your Honor.

The Court: Yes, and there is a window on this one side. You say metal strips, do you mean screen wire?

The Witness: No, sir.

The Court: Solid metal?

The Witness: Solid metal.

The Court: I cannot see any solid metal.

The Witness: The window comes off, your Honor. It is held on with Scotch tape.

The Court: The solid metal is where? It runs horizontally or vertically?

(Testimony of Richard Everett Brown.)

By Mr. Baldwin:

Q. Is it up in the frame channel?

A. It is up in the frame channel.

You can see it right here, the edge of it right there, your Honor. (Indicating.)

The Court: That is just around the outside.

The Witness: That is right.

The Court: It doesn't go all the way through?

The Witness: No, just down the edge in here.

The Court: I thought you said that it separated each strip. I misunderstood you then.

By Mr. Baldwin:

Q. What is the purpose of that solid metal piece? [870]

A. To make each of these separate pads so that they are all separable.

Q. Is that a spacer?

A. It is a spacer, that is right, to separate the two pads.

The Court: Which is the top of this, the one with the window on the side or where the window is on the top?

The Witness: This would be the top. This is the side. (Indicating.)

The Court: With the glass window on the left side?

The Witness: Yes.

By Mr. Baldwin:

Q. Can we put that in the record as stating that the filter would be used with the glass window vertical is that correct?

(Testimony of Richard Everett Brown.)

A. No, because the approach face would be of this order.

Q. Then the glass window would be vertical?

A. Yes.

The Court: The glass window would be vertical and to the left of the approach side?

The Witness: Yes, sir.

The Court: Very well.

By Mr. Baldwin:

Q. I hand you Defendants' Exhibit N and ask you if you [871] understand what that filter is.

A. It is a Detroit air filter.

Q. Would you state the relationship between the construction of Defendants' Exhibit N and Defendants' Exhibit WW? Is there a relationship between them?

A. Well, the difference is in the material from which it is made. The Detroit air filter is made from paper and the filter in your Honor's hand is made from screen cloth.

The Court: How big are these crimps here compared to the crimps there? These are much smaller crimps, are they not?

The Witness: I would judge that there are about four per inch on that, maybe three per inch, and four per inch on this.

By Mr. Baldwin:

Q. When did you make Exhibit WW?

A. Saturday, December—whatever last Saturday was.

Q. The eighth?

A. The eighth.

(Testimony of Richard Everett Brown.)

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit XX.

(The device referred to was marked Defendants' Exhibit XX for identification.)

By Mr. Baldwin:

Q. Did you test Exhibit WW?

A. Yes, it was tested in the method I have described, [872] 520 feet a minute using Arizona road dust with a rate of dust feed of 20 grams per hour figured on the basis of a 20x20.

Q. I hand you a paper marked for identification Defendants' Exhibit XX and ask you if you can identify it, if you will.

A. Yes, I can identify this graph. I made the graph.

Q. And what does it show, I mean what is on the graph?

A. It illustrates the dust holding capacity, the pressure drop rise and the efficiency trend. The pressure drop starts at .095 and ends at .14.

The efficiency after the end of the first hour——

The Court: Where is the first hour?

The Witness: The first point on the efficiency curve, which is the dotted curve.

The Court: These?

The Witness: This is the dust holding capacity down here.

The Court: Lines 30, 60, 90, 120——

The Witness: This is the dust holding capacity in grams per square foot of net panel area.

The Court: And the next line is?



(Testimony of Richard Everett Brown.)

The Witness: Dust holding capacity in ounces for a 20x20 panel.

The Court: That is translated?

The Witness: Yes. [873]

The Court: Where are the hours?

The Witness: There are no hours. Each one of these points indicates an hour on the efficiency curve, which is the top dotted curve.

The Court: I see.

The Witness: Each point is an hour's run.

The Court: Very well. Now you said at the end of what hour?

The Witness: At the end of the first hour the efficiency was slightly more than 83 per cent and at the end of the 10 hours the efficiency was slightly more than 88 per cent.

By Mr. Baldwin:

Q. Would you read the pressure drop at the beginning and the end of your test?

A. The pressure drop at the beginning was .095 and at the end it was .14 inches of water.

Q. Can you translate—for instance, at the end of the bottom line of data it says 19.9, which you have stated is translated into ounces on a 20x20 panel, is that correct?      A. That is correct.

Q. Could you tell the Court what that would be in grams since we have some other curves that are stated to be in grams? [874]

A. There are 453.6 grams per pound. That would be 560 grams at 19.19 ounces.

The Court: 560 grams?

(Testimony of Richard Everett Brown.)

The Witness: Yes, your Honor.

The Court: At the end of the 10 hours, is that right?

The Witness: No, that is at the end of the bottom scale, 19.9.

Mr. Baldwin: I just thought the Court might like a comparison.

I offer Defendants' Exhibit XX in evidence.

I also offer the filter panel WW in evidence, your Honor.

The Court: They are both admitted.

(The devices referred to were received in evidence and marked Defendants' Exhibits XX and WW respectively.)

[Printer's Note: Defendants Exhibit XX is reproduced in Book of Exhibits.]

By Mr. Baldwin:

Q. You stated that you used Arizona road dust as your test dust for the filter WW and as reported in the data on Exhibit XX. What kind of Arizona road dust was that?

A. It is called on the bottle that we buy from AC Division, General Motor Corporation, from either—I think it is Pontiac. It might be Saginaw, Michigan. It is called Arizona Fine Air Cleaner Test Dust. [875] \* \* \* \* \*

Q. I hand you a copy of Plaintiff's Exhibit No. 8 and call your attention to the page on which appears Graph No. 1, and call your attention to a dust

(Testimony of Richard Everett Brown.)

specification and dust analysis appearing there. Does that properly represent the Arizona road dust which you utilized in testing Exhibit WW?

A. It looks like the same thing.

Q. Have you read, and do you understand, the translation of the French patent to Niestle, No. 739,956?

A. Yes. I have read it, and yes, I do understand it.

Q. Have you ever constructed a filter panel according to the teachings of this French patent?

A. Yes, sir, I have.

Q. When did you construct such a panel?

A. Saturday, December 8th.

The Court: You were busy that day, weren't you?

The Witness: We certainly were.

(A device was marked Defendants' Exhibit YY for identification.)

The Clerk: Exhibit YY.

The Court: That is a seven by seven?

The Witness: Yes, your Honor.

By Mr. Baldwin:

Q. I hand you a filter marked for identification Defendants' Exhibit YY and ask you if you can identify it. [877] A. Yes, I can.

Q. What is it?

A. This is what we call a French P-5. It is the panel made by the teachings of the Niestle patent.

The Court: The French P-5?

(Testimony of Richard Everett Brown.)

The Witness: That is what we call it in the laboratory.

By Mr. Baldwin:

Q. Will you state the nature of the screen mesh material in this Exhibit YY?

A. This is made from 16-mesh bronze screen cloth. There are six layers. Each individual layer has been slotted and slit and expanded so that there are zigzag passages through the filter media.

Q. Did you test that Defendants' Exhibit YY?

A. Yes, I did.

Q. And under what conditions?

A. It was tested at 519 feet a minute with Arizona road dust, A.C. standardized air cleaner test dust, dust fed in at the rate of 20 grams per hours for a 20 by 20 panel.

Q. On what apparatus did you test it?

A. On the apparatus I described previously.

Q. Where?

A. In the Air-Maze Corporation testing laboratories.

Q. And what procedure did you use for the tests?

A. The same procedure that I outlined previously. [878]

Q. I had you a paper marked for identification Defendants' Exhibit ZZ and ask you to identify it, if you can.

(The paper referred to was marked Defendants' Exhibit ZZ for identification.)

(Testimony of Richard Everett Brown.)

A. This is chart of the results of the test run on the Exhibit YY.

The Court: By the way, I notice this has a glass window. Which is up and which is down?

The Witness: In this case, this was (indicating)——

The Court: From the intake or uptake or out-flow?

The Witness: This was in the top.

By Mr. Baldwin:

Q. The window was the top?

A. The glass window was the top.

The Court: The glass window was the top and it didn't make any difference which side was the intake?

The Witness: No, sir.

The Court: Which one was the intake in this test?

The Witness: I don't know that I know, unless it is marked on the panel with an arrow. I cannot tell now. It is the same front and back.

The Court: Did you wash this since?

The Witness: Yes.

The Court: You have washed the other one?

The Witness: Yes. The other one was washed.

Mr. Baldwin: I did not wish to contribute any more dirt to the courtroom, your Honor.

The Court: O.K.

By Mr. Baldwin:

Q. Will you read some values from your data on the Exhibit ZZ?

(Testimony of Richard Everett Brown.)

The Court: Wasn't there another one here, that Professor Rowley made and had a chart on?

Mr. Baldwin: That was Exhibit MM.

The Court: The chart, MM. Here it is. All right.

The Witness: The initial pressure drop was .075, and at the end of 10 hours run the pressure drop was .14.

The initial efficiency was 79.5 per cent, and at the end of 10 hours the efficiency was slightly less than 70 per cent.

The curve is on the same form as Exhibit XX.

Mr. Baldwin: Your Honor, I offer in evidence Defendants' Exhibits YY and ZZ.

The Court: Admitted.

(Said device and document, marked Defendants' Exhibits YY and ZZ, respectively, were received in evidence.)

[Printer's Note: Defendants' Exhibit ZZ is reproduced in Book of Exhibits.]

\* \* \* \* \* [880]

### Cross Examination

By Mr. Leonard S. Lyon:

Q. What do you mean by your statement that in the tests reported on Exhibits XX and ZZ you used a filter dust-feeding rate corresponding to 20 grams per hour based upon a 20-20 panel?

A. Since the test section is a quarter of a square foot, the rate of feed or the dust concentration is

(Testimony of Richard Everett Brown.)

the same on the six by six section as it would be in a 20 by 20 section.

Q. But, what rate did you actually use?

A. 14.85 grains per thousand cubic feet.

Mr. Leonard S. Lyon: Now, will you hand the witness Exhibit 13, please, Mr. Clerk.

Q. You have stated that the test reported on Exhibit XX was continued for a period of 10 hours.

Is that correct? A. That is correct.

Q. At the end of that time, what was the dust load on the filter?

A. Equivalent to 258 grams per square foot.

The Court: I thought you said it was 560 grams.

The Witness: That is for a 20 by 20 panel, your Honor.

The Court: What was it actually on this seven by seven?

The Witness: It would be one-quarter of the 258.

The Court: Of 258?

The Witness: 258 divided by 4. [881]

The Court: 64.5 grams.

By Mr. Leonard S. Lyon:

Q. So, does that mean that compared to Exhibit 13, your test on Exhibit XX continued to a point that corresponds on Exhibit 13 to 541 grams for the dust load on the filter?

A. It would be slightly beyond that, because 541 is 19.9 ounces, and this would be more than that.

Q. Which would be more than that?

(Testimony of Richard Everett Brown.)

A. The dust load on this panel in Exhibit XX would be more than 541 grams.

Q. 19.9 grams per square foot net of panel area indicates the point at which you discontinued your curve, which corresponded to 541, is that right? Oh, you went a little beyond——

A. We went a little beyond.

Q. ——the 19 points?                      A. That is right.

Q. How much beyond?

A. Whatever 1/10 hour took the total quantity of rate to.

Q. You don't know how much that was?

A. Well, yes. I can figure it out from the exhibit.

Q. I would like to get the total dust load in the test reported in Exhibit XX and find out where on Exhibit 13 there was a comparable dust load in the test reported on [882] Exhibit 13.

A. 585 grams on chart No. 13, on Exhibit 13.

The Court: Where would that be?

The Witness: Well, roughly two lines to the left of the 600.

The Court: I see it.

By Mr. Leonard S. Lyons:

Q. In making the model, Exhibit WW, you stated that you employed 14-mesh screen at whose instruction?

A. We received a phone call on Saturday requesting that a test panel made to the teachings of the Kaiser and Manning and the Niestle patents be made. We made it with the material we had available.



(Testimony of Richard Everett Brown.)

Q. And in the instructions you received over the phone, was there any discussion as to what mesh to use?

A. 14-mesh, 16-mesh, or 18-mesh, because those are the screen cloths that we carry in stock and something that we could make promptly.

Q. Were you told to make them out of screen mesh? A. Yes.

Q. And did you discuss over the phone, with whoever was calling you, what mesh to use?

The Court: He said he was told—oh, excuse me.

A. Well, we were told to make it of a mesh that we have, of either 14, 16, or 18. [883]

By Mr. Leonard S. Lyon:

Q. Going back to Exhibit 13, you state that Exhibit XX was loaded corresponding to 585 grams. That was at the end of 10 or 11 hours?

A. 10 hours.

Q. 10 hours. Now, that load was reached in the test reported on Exhibit 13, in 38 hours, was it not?

A. I don't know.

Mr. Baldwin: I object to that question. There are no hours indicated on Exhibit 13.

Mr. Leonard S. Lyon: Well, you can figure it from Exhibit 13, can you not?

The Court: There are no hours indicated. The objection is overruled.

By Mr. Leonard S. Lyon:

Q. You have the efficiency and you have the feeding rate and you have the total dust load.

A. It could be figured, yes.

Q. Would it take you some time to do it?

(Testimony of Richard Everett Brown.)

The Court: Was it 20 grams an hour?

Mr. Leonard S. Lyon: Yes.

The Court: And by the time it reached 581, you divide 20 into 580, don't you, to get the hours?

Mr. Leonard S. Lyon: It is not as simple as that.

Mr. Harris: It doesn't state 20 grams per hour, your [884] Honor.

Mr. Leonard S. Lyon: You then divide by the efficiency, your Honor.

The Court: It was testified that it was 20 grams an hour.

Mr. Harris: This witness did not so testify. He didn't make this computation.

By Mr. Leonard S. Lyon:

Q. Well, if it was fed at the rate of 20 grams per hour and with the efficiency that appears on Exhibit 13, how long did it take the testing to produce a dust load of 585 grams?

A. 585 grams, at 20 grams an hour?

Q. Yes.

A. At 20 grams an hour?

Q. Yes, with an efficiency as shown on Exhibit 13.

A. Do I average the efficiency or do I take the averages at that particular point, or how do I do it?

The Court: Is that 20 grams per hour per thousand cubic feet?

Mr. S. F. Duncan: 20 grams per hour.

The Court: Regardless of the cubic feet, it is 20 grams an hour?

(Testimony of Richard Everett Brown.)

Mr. S. F. Duncan: It is 20 grams an hour, at the test velocity specified on the exhibit.

Mr. Leonard S. Lyon: 519 feet per minute.

The Court: You had some question about it?

The Witness: Yes. What efficiency should I use for the dirt load?

Mr. Leonard S. Lyon: The efficiency curve shown on Exhibit 13.

The Witness: But which point?

The Court: At 581 grams.

Mr. Leonard S. Lyon: That averages about 76 per cent, so use that figure.

The Witness: All right, 76 per cent. (Making calculation.) A little better than 38 hours.

By Mr. Leonard S. Lyon:

Q. Now returning to the mesh that was used in constructing Exhibit WW, who did you receive the telephone instructions from?

A. Mr. Watterson.

Q. And he told you that he wanted you to take a make a model according to the Kaiser patent but use screen wire, is that right?

A. That is correct.

Q. And what did he say about what size of screen wire to use?      A. You mean the mesh?

Q. Yes.

A. He said make it in a mesh that we have available [886] so that the panel could be made and the test run.

Q. Did you tell him what sizes you had available?

(Testimony of Richard Everett Brown.)

A. I think I did at the time.

Q. And what sizes did you have available?

A. 14 mesh, 16 mesh, and 18 mesh.

Q. Why did you select 14 mesh?

A. I don't know that there is an answer to that one. We had a choice of three and we arbitrarily picked one.

Q. The one with the largest holes of the three, is that correct?

A. No, that is not correct.

The Court: Well, it does have the largest holes.

The Witness: It does; that is right.

The Court: Or interstices.

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. What procedure did you follow in oiling the screen in your test with Exhibit WW?

A. The panel was dipped in SAE 40 oil and allowed to drain for two hours in a warm room. When I say "warm," I mean about 78 degrees.

Then the excess oil was blown or sucked from the filter panel until the weight of the panel closely approximates that of previous tests, the quantity of oil on the panel.

Q. In other words, the oil was removed so that the [887] perforations formed in the screen wire were not clogged with oil, is that correct?

A. No, the purpose for the——

Q. I am not asking for the purpose but as to the fact. Were the perforations open or were they clogged with oil?

(Testimony of Richard Everett Brown.)

A. They were open, as is the case in all panel tests, or most panel tests using that mesh.

Q. Now turning to your tests on this model you made of the Niestle patent, did you receive instructions from Mr. Watterson as to that model?

A. Yes.

Q. What did he tell you to make the model out of? A. Either 14, 16, or 18 mesh.

Q. Wire cloth? A. Wire cloth.

Q. And what mesh did you use?

A. 16 mesh.

Mr. Leonard S. Lyon: Mr. Clerk, will you show the witness Exhibit MM?

(The exhibit referred to was passed to the witness.)

The Court: Why did you use copper there instead of galvanized screen wire?

The Witness: We did not have aluminum or steel screen wire that could be formed to that shape.

The Court: I see.

The Witness: It would have taken a special run of wire to get that.

By Mr. Leonard S. Lyon:

Q. Do you have any knowledge of that test?

A. Yes, I do.

Q. Did you perform that test?

A. No, I did not.

Q. What knowledge do you have of it?

A. I know that I saw, instructed the testing technicians and the men in the laboratory to make

(Testimony of Richard Everett Brown.)

the panel. It was made of 30 mesh. I know that Professor Rowley had been asked to run tests on this specific filter.

Q. And were the tests made in your laboratory?

A. No, they were not.

Q. Have you any opinion as to why the pressure rise on the test shown in Exhibit MM was so markedly different from the pressure rise you report on your Exhibit ZZ?

A. I think there are two reasons. The first reason is the difference in dirt or dust, artificial dust, and the second is probably the opening size in the screen cloth.

Q. Which one is the more important of those two reasons?

A. I don't know that I could break that down.

Q. How was the screen oiled in the test reported on [889] Exhibit ZZ, that is, the screen on Exhibit YY?

A. In the same manner as Exhibit WW.

Q. That is, after being oiled and drained the screen was blown with air so that the perforations were opened up?

A. No, it was sucked. It was put on the blower and the air sucked through the panel.

Q. To open up the perforations?

A. No, to make the quantity of oil on the panel the same as would be on the panel had it been tested with the proper time for drainage.

Q. As a matter of fact, that procedure did open up the perforations, did it not? A. Yes.

(Testimony of Richard Everett Brown.)

Q. Now what oil did you use?

A. SAE 40 oil.

Q. In both cases, both on Exhibit WW and on Exhibit YY?

A. That is correct.

Mr. Leonard S. Lyon: That is all. [890]

\* \* \* \* \*

Richard Everett Brown, recalled as a witness on behalf of the defendants, having been previously duly sworn, testified further as follows:

### Redirect Examination

By Mr. Baldwin:

Q. Mr. Brown, I had you Defendants' Exhibit XX. You were asked, on cross-examination, to make a quick calculation as to the dust feed involved in the data of that chart. I refer you to the legend in the upper left-hand corner of the chart and ask you if you will start with that and explain to the court how you arrive at the proper statement as to the dust feed per hour in that filter.

A. The rate of dust feed conducted in the test was at 14.85 grains per thousand cubic feet.

There are 15.43 grains per gram, which means that there is slightly less than one gram per thousand cubic feet of air.

A 20 by 20 filter, at 520 feet per minute, filters a total volume of 1200 cubic feet of air per minute. In one hour's time that would be 60 times 1200, or 72,000 c.f.m., [893] or 72,000 cubic feet.

At slightly less than one gram per thousand cubic feet would mean that they would have slightly less

(Testimony of Richard Everett Brown.)

than 72 grams per hour dust feed. I said that we fed at the rate of 20 grams per hour, which was incorrect. We fed at the rate noted here on the chart.

The Court: That is 14.85 grams or grains?

The Witness: Grains.

The Court: Grains per thousand cubic feet?

The Witness: Yes, sir.

The Court: Which, translated through this calculation which you have made, means that you fed into the seven-inch filter 72 grams in an hour?

The Witness: No, sir. Rated on a 20 by 20 basis, it would be 72. On the actual six by six section, or seven by seven, there were 7.5 grams per hour gross dust feed.

The Court: Grams?

The Witness: Grams.

The reason we rate in grains is because the American Society of Heating and Ventilating Engineers' guide gives dirt concentrations in grains per thousand cubic feet. So, in some effort to be consistent with a supposed standard for the subject, we have always tried to rate in grains per thousand cubic feet. It confuses the system, "grains" and "grams," but that is the way the "animal" is. [894]

By Mr. Baldwin:

Q. Mr. Brown, you were asked on cross-examination to compare the load on the filter, Exhibit WW, at the end of 10 hours, with the dust load on Plaintiff's Exhibit 13 at the end of approximately 36 or 38 hours. Does what you have said relate to the comparison that you were asked to make there?

A. Yes, it does, because when the amount of dust



(Testimony of Richard Everett Brown.)

that drops from the air, before it gets to the panel, and the amount that passes through the panel, is deducted from the 10 hours times 600, or roughly 72 or a little less than that, it comes out about 69 grams actually for a 20 by 20 filter panel. The amount that drops out and the amount that goes through accounts for the 580 that is actually charted or plotted on the chart, and that is roughly three—well, two and one-half times the 20 grams per hour shown on Exhibit 13—roughly, three times, rather.

Mr. Baldwin: That is all.

Mr. Leonard S. Lyon: No questions.

The Court: Step down.

(Witness excused.)

The Court: The defendants rest again?

Mr. Baldwin: Yes.

(Whereupon the defendants rested their case in chief.) [895]

Mr. Leonard S. Lyon: Exhibits 24, 25 and 26 which have been marked for identification, No. 24 being a Canadian patent, No. 25 being an evaporator patent, and No. 26 being a photo through the evaporator, have not been received in evidence, and I will ask that the three of them be received in evidence.

The Court: Admitted.

(The documents referred to were received in evidence and marked Plaintiff's Exhibits Nos. 24, 25 and 26.)

[Printer's Note: Plaintiff's Exhibit 26 is reproduced in Book of Exhibits.]

\* \* \* \* \*

Mr. Leonard S. Lyon: The defendant has offered in evidence as Exhibit OO a patent granted to the defendant on the P-5 filter. This is a patent subsequent by many years to the patent in suit.

I would like to offer in evidence at this time a certified copy of the file history of that patent and ask that it be marked Exhibit——

The Clerk: No. 28.

Mr. Leonard S. Lyon: ——No. 28. [896]

(The document referred to was marked Plaintiff's Exhibit No. 28 for identification.)

The Court: It will be received in evidence.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 28.)

\* \* \* \* \*

### SYDNEY F. DUNCAN

called as a witness by and on behalf of the plaintiff in rebuttal having been previously duly sworn, was examined and testified as follows: [897]

The Court: You have been sworn before?

The Witness: Yes.

### Direct Examination

By Mr. Leonard S. Lyon:

Q. I show you a document entitled test data on Farr Company air filter performed in accordance

(Testimony of Sydney F. Duncan.)

with Association of American Railroads standard test, which I will ask be marked Exhibit 29 for identification.

(The document referred to was marked Plaintiff's Exhibit 29 for identification.)

By Mr. Leonard S. Lyon:

Q. Did you write this document?

A. I may not be responsible for all the words in it, but I was instrumental in producing it.

Q. When was it prepared?

A. Approximately 1942.

The Court: Was it prepared under your supervision?

The Witness: Well, a little better than that—I did a lot of the work on it myself.

By Mr. Leonard S. Lyon:

Q. And you approved it at that time, did you?

A. Yes.

Q. This document contains two sheets of curves. Referring to the first sheet of curves in the document, will you explain what those represent? [898]

A. The sheet labeled R-2 in the corner?

Q. Yes.

A. That curve represents the performance values of three filters plotted on one page. According to the legend at the bottom of the curve, there is a dotted line labeled Brand X filter, 2 inches thick, heavy oil.

There is a solid line which is labeled Farr air filter, 2 inches thick, light oil.

(Testimony of Sydney F. Duncan.)

There is a dash-and-dot line labeled Brand Y filter, 4 inches thick, light oil.

The solid curves on this chart were the ones that I ran using a test dust which was as nearly the same as we could possibly make it as the test dust used in preparing the data for Exhibit 27, which is the Association of American Railroads report on competitive filter performance.

The rate of air flow was 300 feet per minute, as it was in the tests described in Exhibit 27, and the rate of dust fed was 20 grams per hour, the same as the rate described in Exhibit 27.

The curves labeled Brand X and Brand Y, that is, the dotted lines and the dot-and-dash lines are reproduced from data shown in Exhibit 27.

The Court: Let me see Exhibit 27.

(The exhibit referred to was passed to the court.)

The Court: In other words, they are copied from charts [899] that are here?

The Witness: Yes, your Honor.

The Court: What charts?

The Witness: Brand X filter, that is the dotted line, is a copy of the curves shown in Fig. 8 on—I don't know the figure number. Fig. 8 is Brand X filter, which is an Air-Maze filter.

Brand Y is on Fig. 15 of Exhibit 27 and that is an American air filter, 4 inches thick.

Brand X is an Air-Maze filter 2 inches thick.

The Court: Brand Y is Fig. 15?

(Testimony of Sydney F. Duncan.)

The Witness: Fig. 15.

Mr. Leonard S. Lyon: Have you finished?

The Court: I guess he has.

The Witness: I thought perhaps your Honor had a question.

The Court: Go ahead.

The Witness: These curves show that the pressure drop of the Farr filter compared to two other well-known filters existing at that time and tested as nearly as possible under the same conditions of type of dust, rate of dust fed and rate of air flow, that that Farr filter showed a much lower pressure drop and a slower pressure rise.

By Mr. Leonard S. Lyon:

Q. I think Professor Rowley said that the Air-Maze [900] filter that was reported in Exhibit 27 was an Air-Maze A type. Do you know what the Air-Maze A type was?

A. Well, the Air-Maze type A was a filter made according to the teachings of the Greene patent, and I think it is described in Exhibit 27 as having graded screen from front to back starting with about 5/16 mesh on the front and going down to a fine mesh on the back.

Q. What difference was there between the Air-Maze type A filter and the Air-Maze type B filter which is here in evidence as Exhibit 5?

Mr. Harris: May we learn, if the Court please, whether Mr. Duncan has ever seen a type A Air-Maze filter?

The Witness: A long time ago; yes. Not recently.

(Testimony of Sydney F. Duncan.)

The Court: He had not answered Mr. Lyon's question. Do you remember it?

The Witness: The difference was principally that the type A filter had more screen in it than the type B filter.

By Mr. Leonard S. Lyon:

Q. What do you mean by that?

A. There were more layers and more pounds of screen, so to speak, therefore more material in the filter to accumulate dust.

Q. Was the Farr filter that you tested and reported the results of the test in the solid lines curves on Exhibit 29, the filter of the patent here in suit like Exhibit 2? [901]

A. As nearly as slight variations in manufacturing over a period of nine years could make it, yes, packed four layers to the inch, 14 mesh screen.

Q. Does Exhibit 29 on the first page following the title page give the composition of the dust which you employed in that test?

A. Yes, it does, in the table about the middle of the page, which is the same composition as it set forth in Exhibit 27. We made some effort to obtain the same kind of Pocahontas ash and had some difficulty.

Q. Are the values that you plotted on this curve sheet, R-2 of Exhibit 29 for your test with the patented Farr filter, correct as you obtained those values in the test?

A. Yes, they are. There is a difference in the way these curves are plotted and the way some of

(Testimony of Sydney F. Duncan.)

the other curves have been plotted in that the efficiency curve on sheet R-2 of Exhibit 29 is drawn from point to point rather than drawing a smooth line through the general trend of the points as was done in Exhibits 11, 13 and several of the curve exhibits presented by the defendant.

Q. Were these curves for the test with the Farr filter obtained from tests on the same apparatus that Exhibit 13 curves were obtained from?

A. No, this was tested on a variety of the apparatus which preceded this one. Actually it was a vertical test [902] duct so that there was no opportunity for any dust to settle out of the air stream on the floor of the duct. All of the dust fed into the air stream had to reach the filter, which would have assured as high a pressure rise as we could get under the circumstances.

Q. As I understand you, this curve sheet, R-2, in Exhibit 29, is to furnish the court with comparative curves of tests with the Farr filter, the patent in suit, and the old type Air-Maze filter made with the same dust and under the same conditions, is that correct? A. That is correct.

Mr. Leonard S. Lyon: We will ask that Exhibit 29 be received in evidence.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 29.)

[Printer's Note: Plaintiff's Exhibit 29 is reproduced in Book of Exhibits.]

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. I would like to ask you some questions, Mr. Duncan, about the effect of the use of different dusts in different tests. First, will you tell us why in your present test work you have adopted this so-called Arizona road dust?

A. A comparison of the efficiency values on sheet R-2 of Exhibit 29 and the efficiency of the Farr filter as shown on Exhibits 11 or 13, demonstrates that under the testing procedure used previously we obtained a rather high efficiency. [903] An examination of many of the curves in Exhibit 27 show that filters built in somewhat different fashions but used for approximately the same purpose show a uniform rather high efficiency, and it was discovered by us and others that filters of various designs were sensitive to the particle size of the dust. Using a dust which gave all filters a rather high efficiency made it very difficult to distinguish any preferential efficiency of one filter over another, and so after trying a number of combinations of dust we settled on the so-called standardized fine air clean test dust No. 1543094 as a dust to use because in testing various air cleaning devices in our own laboratory we found that this dust gave a significant difference in efficiency which could be attributed to perhaps difference in the amount of oil or difference in construction or difference in the mesh of the wire and other factors in which we were interested.

A second and very important reason for our choosing the standardized fine air cleaner test dust



(Testimony of Sydney F. Duncan.)

was that it was the only one that we could buy from a reliable source that would be the same from batch to batch or lot to lot and that would be probably the same from year to year because of the rather rigid controls that are exercised in its preparation. By Mr. Leonard S. Lyon:

Q. Have you found by experience whether or not the screening of a dust through a 325-mesh screen is sufficient classification of the dust particles for test purposes?

A. Well, for my purposes it is not, because putting all of the dust that you are going to use through a 325-mesh screen only assures you that there are not particles larger than would pass through the screen.

It doesn't give any information as to the variation and distribution of that particle's size of the dust that actually goes through the screen. If my recollection serves me right, a 325-mesh screen passes a particle which is about 40 to 44 microns average diameter.

The Court: Would the screen pass dust of smaller microns, smaller than that size?

The Witness: It will pass all dust smaller than 40 or 44 microns.

The Court: What about your dust?

The Witness: In the standardized fine air-cleaner test dust, it is about 40 per cent of the dust, which is about zero to five microns in range.

The Court: What about dust in the air?

The Witness: The particles' sizes range widely,

(Testimony of Sydney F. Duncan.)

from zero up to five and on up. Forty microns is a fairly large particle, and if made of a mineral oxide, as many of our [905] dusts are, the kinds that stir up from the street or are blown up by winds, those particles settle out rather rapidly and so those do not enter into the ventilating system in large quantities.

The Court: In other words, your purpose in getting the measurement of the finer dust is to ascertain whether or not a screen would take out the finer dust? In other words, it is easier to get out the big particles than the small particles?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Have you in your experience found whether or not it is possible to correlate the results of tests made otherwise under similar conditions but using different dusts?

A. Except for a recent endeavor, we haven't made too many tests that would correlate the answers between, for instance, the A.A.R. dust and our present dust.

The Court: "A.A.R." means what?

The Witness: American Association of Railroads (Exhibit 27), containing the Pocahontas ash and lampblack and fly ash and Fuller's earth.

We have tested the same filter with different dusts under otherwise similar conditions and have observed that the efficiency changes. Generally, the efficiency rises with increase in size of particles. The pressure drop characteristic may change with a par-

(Testimony of Sydney F. Duncan.)

ticular kind of dust. Testing with a [906] material which contains fibers of some sort, the pressure drop rises rather rapidly.

By Mr. Leonard S. Lyon:

Q. Then, I take it, if you are going to compare two tests made under otherwise similar conditions, between two filters, they should be made with the same dust, is that correct? A. Yes.

\* \* \* \* \* [907]

Q. Reference has been made in Professor Rowley's testimony to the jolted density of his Pocahontas type dust as compared with the density of the Arizona dust, and reference has been made to the specific gravity of this Pocahontas dust as compared with the specific gravity of Arizona dust. Will you first state which is material in the test procedure to know, the jolted density or the specific gravity?

A. Well, both of those factors have some effect. However, a clear distinction should be made. When I have spoken of specific gravity, I have referred to the material of which the dust is composed.

When Professor Rowley speaks of jolted density, he carefully explained, I believe, that it was a bulk density obtained by settling down in a graduate a weighed quantity of dust and then measuring its volume.

As the dust in a test set approaches the filter, it has already been through a dispersion process which should have broken it down into its individual particles. To be sure, there may be some of those very

(Testimony of Sydney F. Duncan.)

fine particles which are agglomerated into slightly larger particles, but, in the aspirating system of most of the test sets, in the dust-feeding systems, the dust is picked up from one source and is hit with an air blast which drives it into the air [908] stream entering the test duct, and hitting it with that air blast. Well, the purpose is to break it down into those individual particles, not to break a particle, but just to disperse the particles. If the particle itself is something like volcanic ash or diatomaceous earth—

The Court: Fullers' earth?

The Witness: No—diatomaceous earth. Diatomaceous earth is the skeletons of little animals, little diatoms, and they have a hole in it, so they occupy more space than the solid silica out of which it is made, a particle of that sort would show a large bulk compared to its mass, whereas a particle which was made by grinding up material like cement shows a smaller bulk compared to its mass.

In the case of the dust used by Professor Rowley, as duplicated in our laboratory over the week end, we had some Pocahontas ash and some K-1 carbon black, it was screened according to the procedures outlined by Professor Rowley, and we measured the jolted density of our sample of that dust to see if there was a correlation between that and the dust that he used.

We discovered the jolted density of our dust to be .55, that is .55 grams per cubic centimeter.

A further measurement was made upon the specific gravity of the dust, and it was determined to be 2.4.

(Testimony of Sydney F. Duncan.)

The Court: What was 2.4? [909]

The Witness: The specific gravity of the material of the Rowley dust.

The Court: The material was 2.4, and the dust, when you got it jolted, was .55?

The Witness: Right.

The Court: And the rest of it was air?

The Witness: The rest of it was air.

The standardized fine air-cleaner test dust used—

The Court: You mean the Duncan dust?

The Witness: The Duncan dust. Thank you—has a jolted density of 1.08 and a specific gravity of 2.5. The material then, out of which the two dusts are composed——

The Court: Which would indicate that your Duncan dust has more small particles?

The Witness: And it packs better.

The Court: It packs better?

The Witness: Yes.

The Court: If I understand you correctly, from what you have been saying, without saying so, is that dust composed of large particles will adhere more readily to one of these impingement air cleaners than dust composed of fine particles; in other words, it is easier to catch the big particles than it is the smaller ones.

The Witness: Yes, your Honor, it is.

The Court: And one of the aims and objects of producing [910] an air-cleaning or -filtering system is to get as much dust, regardless of whether it is large or small, as possible?

(Testimony of Sydney F. Duncan.)

The Witness: That is right.

\* \* \* \* [911]

(The document referred to was marked Plaintiff's Exhibit No. 30 for identification.)

By Mr. Leonard S. Lyon:

Q. Will you explain this sheet 30 and what test data it records?

A. On Exhibit No. 30, titled "Replot of 20 by 20 by 2 filter panel test curves," there are shown three curves of efficiency and three curves of pressure drop. One of these curves of efficiency, the dotted line, is a reproduction of the curves shown for the Farr filter on Exhibits 11 and 13. It is the same curve.

The dashed line in both the pressure drop and the efficiency is labeled on Exhibit 30 "Air-Maze P-5 by Rowley, at 300 feet per minute," and is a replot to the scale shown on Exhibit 30. We have "Efficiency per cent" as ordinate and "Dust load on filter, grams" abscissa, a replot of HH.

The Court: What is that?

The Witness: Abscissa.

The Court: I don't know if the reporter got it. I don't know what it means.

The Witness: The efficiency is shown, shall we say, up and down on the chart, and the dust load is shown right [912] and left.

The third curve shown as a solid line is labeled "Farr Type 44 by Rowley at 300 feet per minute"

(Testimony of Sydney F. Duncan.)

and is a replot, I believe, of the curve on Exhibit JJ.

Examining the pressure drop curves for Air-Maze P-5, at 300 feet per minute, and the Farr Type 44 at 300 feet per minute, as plotted from the Rowley data, it is observed that up to 500 grams filter load the points were so close together that I could not draw two lines and I had to draw one.

At about 535 grams load on the filter, a sufficient deviation occurred so that the two lines separate slightly in going from 535 grams out to a little under 700 grams.

The Court: Let me see, now. Wait a minute.

The Air-Maze P-5 type shown on your Exhibit No. 30 is taken from Exhibit HH, is that it?

The Witness: Yes, your Honor.

The Court: And the Farr Type 44, what is this Farr Type 44?

The Witness: That is the patent in suit.

The Court: Oh, by Rowley, taken at 300 feet per minute, and is taken from Exhibit JJ?

The Witness: Yes, your Honor.

The Court: And your Farr Type 44 by Duncan is taken from Exhibit 13?

The Witness: The same curve appears on both Exhibits 11 [913] and 13.

The Court: I see. All right. Excuse me. I interrupted you in the middle of something.

The Witness: It is quite all right.

The efficiency curves as determined by Professor Rowley, when plotted on one piece of paper to the

(Testimony of Sydney F. Duncan.)

scale of dust load on filter, grams, shows that the efficiencies determined by him for the Air-Maze P-5 and the Farr Type 44 show no particularly significant differences.

By Mr. Leonard S. Lyon:

Q. Were those comparisons based on the same flow per minute?

A. These two filters, as tested by Professor Rowley, were both tested at 300 feet per minute, I understand. He used his Rowley dust, and they were, I understand, treated similarly as to oiling procedure.

Q. And using the same dust?

A. Using the same dust.

Q. Now, will you compare the efficiency curve that you obtained, using your dust, at the different rate of 519 feet per minute, with the curves that you have just referred to, that were obtained by Professor Rowley?

A. The dotted curve, shown labeled "Farr Type 44 by Duncan at 519 feet per minute," follows the efficiency curve of the P-5 filter very closely. It drops off perhaps, I think, [914] at 600 grams to about 2 per cent lower, that is, the Farr is about 2 per cent lower than the efficiency found by Professor Rowley for the P-5.

The efficiency for the Farr filter found by Professor Rowley at 300 feet per minute corresponds with reasonable closeness, except for that initial hour or two, to the efficiency found by Duncan at 519 feet per minute.



(Testimony of Sydney F. Duncan.)

The pressure drop found by Duncan at 519 feet per minute is higher than that found by Professor Rowley, as shown on Exhibit 30.

The Court: Did you test the Air-Maze Type B at 519 feet per minute?

The Witness: No, your Honor, I did not.

The Court: Well, is it more difficult to clean the air at 519 feet per minute than it is at 346 feet per minute?

The Witness: Our experience is that efficiency goes up somewhat with velocity. The efficiency increases with this, with an impingement-type filter, where there are many areas on which dirt may collect; the efficiency increases with velocity because of increased turbulence.

The efficiency also increases with particle size, if these are the only two variables.

So that, in my own opinion, the increase in particle size which I have observed under the microscope, on the dust we have prepared in an attempt to duplicate Professor Rowley's [915] dust, the increase of that particle size over that I know to exist in the Arizona road dust increased the efficiency of the Farr filter somewhat increased the efficiency of However, Professor Rowley tested at lower velocity than I did, which should decrease my efficiency. Slightly compensating changes put the efficiencies at just about the same place.

The Court: In other words, the lower velocity increased the precipitation of the heavier dust?

(Testimony of Sydney F. Duncan.)

The Witness: No. The lower velocity would actually decrease the precipitation.

The Court: Of the heavier dust, of the heavy particles?

The Witness: Of almost any dust.

The Court: All right.

By Mr. Leonard S. Lyon:

Q. Referring now to Exhibit No. 30 and comparing the curves between two filters, all made at 300 feet per minute but with different dusts, at that flow rate would you say there is any significant difference in the curves caused by the use of the different dusts?

A. As far as efficiency is concerned, there is no significant difference between the three efficiency curves shown on the chart of Exhibit 30 as on the pressure rise curves there is a significant difference.

Q. Is there a significant difference between the two pressure drop curves for the Air-Maze filter and the Farr [916] Type 44 filter, both obtained at 300 feet per minute.

A. Well, as I said, reading the data as closely as I could from Exhibits HH and JJ, I had to plot just one line for the two filters out to about 535 grams load, and it was only between there and about 680 grams that I could draw two lines at all. So there can't be a significant difference when the follow the same line.

Mr. Leonard S. Lyon: I offer in evidence Exhibit 30, your Honor.

The Court: Admitted.

(Testimony of Sydney F. Duncan.)

(The chart referred to, marked Plaintiff's Exhibit No. 30, was received in evidence.)

[Printer's Note: Plaintiff's Exhibit 30 is reproduced in Book of Exhibits.]

By Mr. Leonard S. Lyon:

Q. You have seen Defendant's Exhibit VV, produced by Dr. Rowley this morning, have you not?

A. Yes. I have looked at it.

Q. Dr. Rowley testified that the red curves on that exhibit were plotted from data that he obtained jointly with you in a test you both observed over the week end. Will you tell the court the purpose of making that test, and outline the test to the court.

A. The test shown on Exhibit VV in the red lines becomes the results of a test which was run on a Farr Type 44 filter at 519 feet per minute in the Farr Company laboratories, using a dust as near a duplicate of Professor Rowley's [917] dust as we could make it, that is, 80 per cent Pocahontas ash screenings through 200-mesh screen, plus 20% K-1 carbon black screened through 100-mesh screen.

Then the two were mixed and were screened through a 100-mesh screen, as dust was fed at the rate of 20 grams per hour. The velocity in the duct, as I said, was 519 feet per minute, and an additional kink was put in the tests, so to speak, in that at intervals the velocity in the duct was reduced to actually about 304 or 305 feet per minute. Because of control limits we could not quite get down to precisely 300. So that, from time to time, as the load

(Testimony of Sydney F. Duncan.)

on the filter built up, we measured the pressure drop across the filter at very close to 300 feet per minute.

The results were computed in the usual fashion, and the red curve of Exhibit VV was drawn by Professor Rowley, and the curves were drawn also by myself. [918]

Q. What filters were employed in this test?

A. The only filter used was a Farr type 44. The test was started about 6:00 o'clock Friday night and it wasn't finished until about 8:00 o'clock this morning, after working all day Saturday to 11:00 o'clock and all day Sunday, 16 hours on Sunday, then on Monday we started at 6:00 o'clock in the morning and ran 26 hours straight.

Q. Did you and Dr. Rowley agree before making this test that this was the best test that either of you could select for the purpose of answering the court's question providing a comparative test at 519 feet per minute between Professor Rowley's dust and the Farr dust?

A. We discussed the matter and came to that agreement.

Q. Now will you produce the sheet that you have prepared showing the comparative results from that test?

A. (Producing document.)

Mr. Leonard S. Lyon: I ask this be marked Exhibit 31.

(The document referred to was marked Plaintiff's Exhibit No. 31 for identification.)

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Will you explain Exhibit 31 to the court.

A. On Exhibit 31, a chart labeled dust comparison tests, there are two efficiency curves plotted. One of them is from the efficiency data provided by Professor Rowley from his test at 300 feet per minute, the other efficiency [919] curve is that obtained over the week end at 519 feet per minute using Rowley's dust.

The efficiency curve obtained by Professor Rowley at 300 feet per minute is the upper dotted line. The efficiency curve obtained for the Farr Type 44 filter at 519 feet per minute over the week end is the upper solid line. The plotted points are shown and somehow or other one of them practically fell off the page due to somebody's tactical error.

The pressure drop at 519 feet per minute for the test run over this past week end is shown as the lower solid line and starts in at approximately .11 inches of water and rises until at the end of the test a point not shown on Exhibit 31 but I believe shown on Exhibit VV, the pressure drop that a dust load of 810 grams was .46 inches.

In the lower part of Exhibit 31 there are two other curves. One of them is a dotted line and is labeled Rowley's test. This is a reproduction of the pressure drop obtained by Professor Rowley when he tested the Farr filter at 300 feet per minute.

The Court: That is JJ and HH?

The Witness: That is JJ, your Honor. The curve labeled Rowley's test at the bottom, the plotted line, is from Exhibit JJ.

(Testimony of Sydney F. Duncan.)

The Court: And what is the other, Duncan's test?

A. The other, Duncan's test, is a plot of data taken [920] over this week end during this particular special test.

The values of pressure drop on the curve labeled Duncan's test are those values which were read when, as the filter loaded during this particular test, the velocity was decreased to 300 feet per minute so that the curves at the bottom of the page could be plotted.

The Court: With identical dust and identical speed as near identical as you could get it?

The Witness: The pressure drops were read at the same velocity. However, the dust was loaded into the filter in one case at 300 feet per minute and in the other case at 519 feet per minute.

The Court: These two at the bottom were run at 300 feet per minute?

The Witness: He ran all his at 300 feet per minute.

The Court: Then you say this is Duncan's test of Farr filter?

The Witness: The test itself ran——

The Court: At 300 per minute.

The Witness: They were just intermediate pressure drops. I decreased it temporarily, read the pressure drop, and ran it back up to 519 feet. The purpose of doing that was to determine what the pressure drop would be on the Farr filter at 300 feet a minute when it had, say, 400 grams of Rowley's dust on it. [921]

(Testimony of Sydney F. Duncan.)

The Court: How did you determine this, that the Farr filter at 519 feet per minute, that the pressure drop increased because it caught more dust?

The Witness: No, because the air was going faster. Or did I misunderstand your question?

The Court: As I understand, the pressure drop occurs because the filter dirties up and it make it harder for the air to get through.

The Witness: That is right.

The Court: Now this pressure drop curve here runs up, the pressure drop for the Farr type 44 filter at 519 feet per minute on Rowley's dust, Duncan's test, that pressure drop goes way up, does it not?

The Witness: Yes, sir.

The Court: Would that indicate, if I understand the testimony, that indicates that the filter is filling up with dirt?

The Witness: That is correct.

The Court: Well, then, in the lower one down here at 300 feet per minute——

The Witness: It is the same amount of dirt in the filter at any given line.

The Court: I see.

The Witness: Take, for instance, a load of 500 grams. At 300 feet per minute through this filter that we were testing [922] over the week end the pressure——

The Court: I see your point. Where they both have 700 grams and both have the same amount of dust in the filter, only the air is going through at

(Testimony of Sydney F. Duncan.)

300 feet per minute and there is not as much air resistance as it is when it goes through at 519 feet per minute?

The Witness: Yes, your Honor.

The Court: We will have the afternoon recess.

(Short recess.)

By Mr. Leonard S. Lyon:

Q. Mr. Duncan, to what do you attribute the difference in the pressure drop curves on Exhibit 31 between the pressure drop curve run at 519 feet per minute and the pressure drop curves run at 300 feet per minute?

A. On Exhibit 31, which shows the same dust load in the filter, the difference between the two sets of pressure drop curves is due to the velocity change.

Q. And not to the difference in the dust?

A. No, because this test has the same dust on it. There is no change in dust in comparing the two velocity pressure drop curves.

The Court: How does that affect the usefulness of the filter from a commercial point of view?

By Mr. Leonard S. Lyon:

Q. I think you are mistaken about what curves I am [923] comparing. I am comparing the pressure drop curve at 519 feet per minute with those at 300. There is two at 300. They were both run with the same dust, is that correct?

A. Yes, they were.

Q. Now to what do you attribute the difference



(Testimony of Sydney F. Duncan.)

between the pressure drop curve at 519 feet per minute on Exhibit 31 with the pressure drop curve at 519 feet per minute on Exhibit 30?

A. The curve labeled Farr type 44 at 519 feet per minute on Exhibit 30 was run with Arizona road dust, all other conditions being as nearly the same as it was possible to make them.

The pressure drop curve labeled Farr type 44 at 519 feet per minute on Rowley dust, Duncan test, on Exhibit 13, used the Rowley dust. The difference, since this is the only variable, the difference is attributed to a difference in the character of the dust.

Q. What do you attribute the dust in the rise to in those pressure curves, what quality of dust or what character of the dust?

A. Principally the fact that it has a larger particle size.

Q. What has?

The Court: You are talking about Exhibit 30 now?

Mr. Leonard S. Lyon: Exhibit 30 as compared with 31 on [924] the two pressure drop curves made at 519 feet per minute.

The Court: Very well.

The Witness: The particle size of the dust, of the Rowley dust, is somewhat larger than the average particle size of the dust used in our laboratory regularly.

The Court: The Duncan dust?

The Witness: The Duncan dust.

The larger particle size makes it easier to catch the particle.

(Testimony of Sydney F. Duncan.)

The Court: The big ones?

The Witness: The big particles.

And since there are more of them there is more weight of dust caught in a given length of time.

The Rowley dust, therefore, loads closer to the face of the filter than the Duncan dust because the Duncan dust is finer. Therefore the Rowley dust, being distributed over a smaller depth of the filter, restricts the passages more rapidly and the pressure rises more rapidly with the dust load.

The Duncan dust being finer and more difficult to catch has to penetrate the filter somewhat further in order to achieve the same efficiency, and so it is distributed down in the filter.

There is a slight indication that since the Rowley dust has a jolted density of .55 and the Duncan dust has a jolted [925] density of 1.18, there is a further indication that perhaps the particles of the Rowley dust have a slightly different shape which makes them a little more bulky for their mass. But since the tests were run with the same oil at the same velocity with the same amount of oil on the filter each time within about a half an ounce, I think the difference in rate of pressure rise can only be attributed to the difference in dust.

By Mr. Leonard S. Lyon:

Q. Comparing the efficiency curves on Exhibit 31 with those on Exhibit 30, do you find that the difference in the dust materially affects the filter efficiency?

(Testimony of Sydney F. Duncan.)

A. In this particular set of curves, no, there was appreciable effect on filter efficiency.

Q. Now referring to the curve for the Air-Maze type B on Exhibit 11, which was made at 346 feet per minute, using the Duncan dust, what in your opinion difference would it make in that curve if the experiment was run at 519 feet per minute using the Rowley dust?

A. I think the comparison is a little easier to make on Exhibit 11 if we assume that it had been run at 800 cubic feet per minute.

Q. Why?

A. Since the principle of impingement applies in both of these filters, both the Farr filter and the Air-Maze type [926] B show in Exhibit 11, the change in the characteristic shape of the pressure rise curve due to changing from Duncan dust to Rowley dust would be of the same kind and order as that shown on Exhibit 31 when compared with the solid pressure drop curve on Exhibit 11.

In other words, the pressure would have started on the Air-Maze type B filter at about the same point that it did start when using the Duncan dust and then the curve would have risen more rapidly just as the curve did for the Farr filter when the dust only was changed.

Q. Do you find anything in the shape or the magnitude of the curve for the pressure drop with the Farr type filter using the Rowley dust on Exhibit 31 which in any way causes you to differ in your testimony that you gave on direct examination with

(Testimony of Sydney F. Duncan.)

respect to the novel and unique operating characteristic of the patented Farr filter?

Mr. Harris: If the court please, may I have that question reread?

The Court: The long and short of it is, he wants to know if he wants to correct his testimony concerning what the witness considered novel and new and improved or better about the Farr filter over the previous filters.

Is that not your question?

Mr. Leonard S. Lyon: That is correct.

Mr. Harris: Very well. [927]

The Court: Do you want to change your testimony?

The Witness: No, I have no correction to make, your Honor.

By Mr. Leonard S. Lyon:

Q. You intend your testimony to stand and you find no reason to consider that there is anything in connection with this pressure curve on Exhibit 31 that conflicts with your testimony, is that what you mean?

A. Exactly, since the only difference between the pressure drop curve on Fig. 31 and the pressure drop curve for the Farr filter on either Exhibits 11, 13 or 30, is that the dust was changed.

Q. Have you prepared a chart of the elements of Claims 4, 5, 7 and 8 of the Farr patent in suit and applied to that chart indications as to whether or not those elements are present in the various exhibits from the prior art and the accused structure

(Testimony of Sydney F. Duncan.)

involved in this case?           A. Yes, I have. [928]

\* \* \* \* \*

(The document referred to was marked  
Plaintiff's Exhibit No. 32 for identification.)

By Mr. Leonard S. Lyon:

Q. Did you prepare this chart?

A. Yes, I did.

Q. In the first column of this chart there is set forth the elements as you find them of Claims 4, 5, 7 and 8 of the patent in suit.           A. Yes.

Q. In the next column, entitled Air-Maze P-5 and Schaaf, have you set forth whether or not you find those elements in the accused P-5 structure?

A. Yes, I have. The Air-Maze P-5 and Schaaf refers to a patent whose number I don't think of now. [929]

\* \* \* \* \*

Q. Will you take Defendant's Exhibit PP and Plaintiff's Exhibit 15-B and with those explain how, in determining that the P-5 accused filter, the row of holes in Exhibit PP, illustrates how there are five different places in the accused P-5 filter where that filter is subdivided into two dimensions?

A. May I have the exhibits, Mr. Clerk?

(The exhibits referred to were passed to the witness.)

The Witness: In Exhibit PP there are five rows of holes that extend through the exhibit. These holes represent contact areas between crimps of screen where one crimp crosses another crimp and makes

(Testimony of Sydney F. Duncan.)

a contact area at that point. The metal of which this is cast could not flow into that area because of this contact.

The contact occurs as shown by the holes in five different places running from the air inlet side of the model to the air outlet side of the model. The holes are pretty well lined up so that a plane passed through the filter parallel to its face would include a stack of these points or areas, small areas, where screen of one crimp contacts the screen of the crimp either below or above it.

Air flowing into any one of the passages is constrained to flow around these contact points.

The only way at these planes of preferable thickness that the air could get from one passage into another is to [930] flow through the mesh of the screen member. So these contact areas, arranged as they are in a quite definite pattern, constitute a division of the airstream that takes place at five places through the filter as shown by this model which is Exhibit PP.

In looking at Exhibit 15-B and allowing the light to shine through it, it becomes apparent to me that these contact areas are definitely areas and not simply points, that air is again constrained to flow around these areas as it follows the Z-shaped passages in the crimp.

This constitutes a division of the approaching air flow into many, many small filaments of air so that the dust borne by the entering air will be brought into close contact or at least near to a dust

(Testimony of Sydney F. Duncan.)  
collecting surface.

By Mr. Leonard S. Lyon:

Q. Will you compare that with the action of the subdivisions formed by the wire gauze in the Farr patent in suit?

A. Well, the mesh screen members of the Farr patent accomplish the same thing. There are areas of contact between the crests of the crimps and the other screen.

The Court: The flat screen?

The Witness: The flat screen in this case as shown in Exhibit 3. [931]

By Mr. Leonard S. Lyon:

Q. Now will you turn to the next column on Exhibit 32?

The Court: That is Claim 4?

Mr. Leonard S. Lyon: No, that is headed "St. Cyr."

The Court: Under Claim 4? You have Claim 4 here.

Mr. Leonard S. Lyon: I have Claims 4, 5, 7 and 8 in the suit, but the elements of all of those four claims are all subdivided and set forth separately in the column of Exhibit 32 entitled "Elements of Claim."

The Court: All I am trying to find out is which page of the chart you want him to look at. The one headed Claim 4?

Mr. Leonard S. Lyon: Yes, your Honor.

The Court: Very well.

By Mr. Leonard S. Lyon:

(Testimony of Sydney F. Duncan.)

Q. Now under the title "St. Cyr" have you indicated your opinion as to whether or not the elements of Claim 4 are present in the St. Cyr patent?

A. Some of them are and some of them are not.

Q. But you have indicated which?

A. I have indicated; yes.

The Court: Let me see, St. Cyr has the air flowing across the surface instead of through it, is that it?

By Mr. Leonard S. Lyon:

Q. The first point, do you find in St. Cyr a filter panel operating on the principle of impingement of particles [932] on collected surfaces?

A. Well, I don't call it a filtering panel.

Q. What difference do you make of it?

A. It is an evaporator type of device.

Q. You indicated opposite No. 3 that the St. Cyr device is not formed with mesh screen members.

A. According to the teachings of the patent in suit it is required in the Farr patent that the screen material be of sufficiently open mesh so that when coated with oil air may flow through the mesh of the screen.

In the St. Cyr device he refers rather frequently to wire gauze, gauze fabric and in particular, on line 15 of the first column, page 1, "consists of a strip of fine metal gauze." In my opinion the fine metal gauze if coated with oil would not allow the air to flow through the mesh and so I have entered a "no" opposite Item 3, Claim 4, mesh screening members, no, in the teachings of the Farr patent.



(Testimony of Sydney F. Duncan.)

Q. Now the next item that I call your attention to is No. 6, the walls of which passage are coated with such mesh members. You indicated "no" and I suppose your answer is the same?

A. My reasons are the same there, that when coated with oil this material would not allow air to flow without it and so far as air flow is concerned, it would present a solid wall. [933]

By Mr. Leonard S. Lyon:

Q. And the next element No. VII, which refers to "said passages changing direction," why do you say "no," that that element is not present in the St. Cyr device?

A. I believe there has been some discussion of the change in direction with respect to Plaintiff's Exhibits V and W.

The change in direction described in Exhibits V and W, in the direction or angle of necessarily straight crimp, chosen in making these exhibits, is an accident of their being wrapped around a cylinder.

The change in direction described with respect to Exhibits V and W is what might be called a uniform change in direction; there is no abrupt change in direction.

There was apparently no particularly intended change in direction, other than that indicated in the St. Cyr patents, in Fig. 5, and the direction of these special corrugations was made annularly to the edge of the strip, and so I have entered a "no."

Q. Now, on the next item, No. VIII, which re-

(Testimony of Sydney F. Duncan.)

fers to the statement in claim 4 that "whereby the medium may flow through \* \* \* said members near the entrance of the panel when the filter is clean and partially through said passages and thence through \* \* \* the members located progressively toward the exit of the panel as the panel becomes [934] progressively loaded with particles," you say that is not present in St. Cyr. Why do you say that?

A. The same reasoning applies to item VIII in column 1, on claim 4; the "no" under St. Cyr is that where they say "filtering panel" and were it oiled as we have been discussing, then the fineness of the mesh of screen would prevent air flowing through the screen because of the presence of oil in the mesh of the screen.

Q. Now, referring to the next column on this same page 1, claim 4, entitled "Henshall," have you there entered which of the elements of claim 4 you believe are present in Henshall and which you believe and absent?           A. Yes.

Q. Referring to item III, the "mesh screening members," you have indicated that those were not present in Henshall. On what do you base that statement?

A. Henshall discloses perforated plates in his dust-collecting surface and is quite particular about the hole size of those plates.

On page 2, column 1, line 27, he starts, "the apertures being one-sixteenth ( $1/16$ )" in diameter," referring to the holes punched in one of the plates.

Lower down on the same page in the same column,

(Testimony of Sydney F. Duncan.)

line 30, "apertures 25 which are smaller, being three sixty-fourth ( $3/64$ ") in diameter. They catch the smaller particles of [935] dust or soot, passing the first section."

Again a size is referred to in the same column in line 40, "one thirty-second ( $1/32$ ") of an inch in diameter."

This is not a mesh screening member or woven wire. It is a perforated plate.

The Court: But in the Henshall patent, the air does flow through the filter without the necessity of flowing through these holes?

The Witness: That is true, your Honor.

The Court: All right.

The Witness: There is some doubt in my mind whether one thirty-second of an inch hole might not be filled easily with oil, but he discloses in the patent that his intention was to have the air flow through the holes or through these——

The Court: Through the passages?

The Witness: ——sheath-like passages.

The Court: Through the passages and the holes?

The Witness: Yes.

The Court: And flows along the surface. In other words, the passages are along the plane of the surface of whatever it is, the metal.

The Witness: Yes, your Honor.

The Court: It is not at right angles to it?

The Witness: Except in a change of direction, but in general it follows the —— [936]

(Testimony of Sydney F. Duncan.)

The Court: Well, the entrance is not at right angles.

The Witness: No. The entrance is generally parallel except for the initial change of the first sheet.  
By Mr. Leonard S. Lyons:

Q. And the next element of claim 4 that you have indicated under Henshall, which is item IV, you have indicated as not present. Upon what do you base that opinion?

A. The sheets of perforated plate in the Henshall patent divide the panel or subdivide the panel in only one dimension and not in two dimensions. There is no face view of it, but looking at Fig. 2, it shows at the upper portion a cut-away end view of the plates which Henshall has assembled, the dimension which is perpendicular to the piece of paper on which the figure is drawn is not divided in any manner by the plates. Such a dimension simply passes along parallel to the front edge of one of those plates, and there is no division.

Q. You have indicated again opposite item VI of claim 4 that Henshall does not have that item. Is that based on the same reason you gave in connection with item III?

A. Yes. These are perforated plates and not screen mesh.

Q. With respect to your testimony that Henshall does not have multiple subdivisions in both dimensions perpendicular to the general direction of flow of the medium to be filtered, what in your

(Testimony of Sydney F. Duncan.)

opinion difference would that make in [937] the operating characteristics of the filter?

A. This lack of the subdivision in both dimensions divides the approaching air stream into a series of sheets.

Mr. Harris: Excuse me. If the Court please, may I ask on voir dire if this witness has ever seen one of these devices made like the Henshall?

Mr. Leonard S. Lyon: Yes.

The Witness: Yes.

Mr. Harris: You have seen one of these?

The Witness: Yes, I made one.

Mr. Harris: Very well. What size, if I may ask?

The Witness: It was a 20 by 20 panel.

Mr. Leonard S. Lyon: Will you finish your answer, if you haven't?

The Witness: The lack of the multiple subdivision in both dimensions lets the air flow through the panel in parallel sheets rather than in many small filaments. For instance, in a 20 by 20 panel, if you space the plates about a quarter of an inch, which is about the spacing of the layers in the Farr filter, and—well, the P-5, I think, has five layers to the inch—would be about 78 or '9 layers, which would make about 78 or '9 subdivisions of the air stream.

In the Farr filter, since it is divided in approximately quarter-inch spaces in both dimensions, there would be 78 [938] squared, or something—what is it?—

The Court: I don't know.

(Testimony of Sydney F. Duncan.)

The Witness: —62,000 divisions of the air flow.

By Mr. Leonard S. Lyon:

Q. Now, referring to the next column for claim 4, have you there set forth the elements of claims 4 which you find present and the elements which you find absent in the Greene patent in evidence?

A. Yes, I have.

Q. You state that item II is not present. Will you state on what basis you formed that opinion?

A. The Greene patent quite definitely discloses that all of the air must flow roughly perpendicular to the screen layers of which the Greene patented filter is built, and, therefore, the members do not extend in the general direction of the intended flow of the medium but extend in a direction perpendicular to the general intended flow of the medium to be filtered.

Q. You have indicated opposite V that that element is absent. Is your answer the same as to that element?

A. There are no intentionally formed passages. Any material through which some fluid may flow must have a passage, but there are no intentionally formed passages in the Greene filter, the same kind of passages that you would have perhaps in a sand bottom and with water percolating through it, they are haphazard, accidental, and not passages in the sense that the passages could be cast in metal as in Exhibit PP.

Q. And for that same reason you find that item VI of claim 4 is not present in Greene, is that correct?

(Testimony of Sydney F. Duncan.)

A. Yes. The mesh screening members don't lie in the right direction.

Q. Item VII of claim 4, which refers to the passages and change in direction, you have indicated that you don't find that in the Greene patent?

A. Well, I don't find the passages, so they don't change in direction.

Q. And you have indicated that item VIII in the Greene patent is not present? A. Yes.

Q. Will you explain the reason for that opinion?

A. In the Green patent, all of the air has to flow through each of the screens in sequence and it has no choice.

The Court: At right angles?

The Witness: At right angles to the plane of the screen, and so it has no choice but to flow through all of them in sequence. Therefore, there is no choice to flow parallel, so that item VIII is absent.  
By Mr. Leonard S. Lyon:

Q. Now, in the next column, entitled "Preble," have you set forth your opinion as to whether or not the elements [940] of claim 4 are found in the Preble prior patent? A. Yes, sir, I have.

Q. You state that item III is not present. On what do you base that opinion?

A. Well, Mr. Preble describes a filter which is made of three sections. The inlet side, referring to Fig. 11, is some kind of expanded metal or screen or material of that nature, the plane of which is perpendicular to the air flow.

On the outlet side there are other layers of ex-

(Testimony of Sydney F. Duncan.)

panded metal, 32, 33, and 31, which are again perpendicular to the direction of flow.

The center section of Preble, made up of, as described in the patent, various kinds of material and designated in Fig. 11 of the patent as 29 and 30, with spaces 28 in between, are not described as being made of mesh screen members.

The Court: Fig. 5. He calls them reinforcing ribs.

The Witness: Fig. 5.

The Court: At 29, it alternates with 30. I see. It is a reinforcing element, and then what he calls a strand, as Fig. 3.

Mr. Leonard S. Lyon: In view of the last answer——

The Witness: Yes, Fig. 3, your Honor, is a view of a kind of expanded metal.

The Court: Yes.

The Witness: And on page 2, column 2, line 94, it [941] begins, and I quote: "The main filtering media within the filter cell comprises a stack 28 (Fig. 11) of viscous-coated diversiform expanded metal sheets each of which is arranged in a plane normal to the inlet opening 16."

Down below, in that same column, column 2, page 2, line 102, at the beginning of the paragraph, "Preferably the stack 28 is composed of 80 double-mesh herringbone expanded metal sheets 29 (Figs. 5 and 6) and 80 corrugated expanded metal sheets 30 (Figs. 7 and 8) alternately arranged," so that at no place does he describe making the middle section of the filter, where the flow may be in general par-



(Testimony of Sydney F. Duncan.)

allel to the planes of the material used, and no place does he describe the use of screen.

By Mr. Leonard S. Lyon:

Q. In view of your testimony, will you explain the basis for your opinion that item II is present in Preble?

A. The description in the patent says, one of the quotes read, beginning at line 94 of column 2 on page 2, "expanded metal sheets each of which is arranged in a plane normal to the inlet opening 16."

The Court: The drawings do not show that, do they? I mean they show that, but they also show the screen behind.

The Witness: Well, the center section of the device has plates of various kinds of material in general laid parallel to the direction of the intended flow of the medium. The front screens and back screens are expanded metal protection sheets [942] depending on the particular choice of the maker.

The Court: It says "two sheets of wire screen." That is 33.

The Witness: Well, 33 is a fine screen. It is shown at Figs. 9 and 10.

The Court: Then there are three of those?

The Witness: Yes.

The Court: What is your answer as to that?

The Witness: Well, in connection with that part of the filter, my answer to II under Preble on this claim 4, which we are discussing, is that for that part of the filter the answer is no. For the center section, it is no. And for the inlet side section where

(Testimony of Sydney F. Duncan.)

we have 31 and 32 extending entirely across the face of the filter in that section, the answer is no.

By Mr. Leonard S. Lyon:

Q. Now, you have indicated that items V, VI, VII, and VIII of claim 4 are absent from Preble. Will you state the basis for your opinion as to those items?

A. My reasoning there is based principally on his repeated description of this center section as being a stack of diversiform expanded metal, or on page 1 of the patent, line 67, column 2, he says, "of a stack of densely compacted diversiform foraminous viscous-coated sheets arranged within the cell with the end faces on one side of the stack directed [943] towards the inlet opening."

In describing the material this way, he draws for me a picture of something which is squashed down together and has haphazard passages through it but no well-defined passages.

Q. Now, with reference to the next column on this page of Exhibit 32, under the title "Slauson," have you there indicated your opinion as to whether or not the elements of claim 4 are in the prior patent in evidence? A. Yes, I have.

Q. You have indicated that item III is absent. What is your reason for that?

A. The Slauson patent states quite clearly in several places that the material to be used is a wool felt or cardboard that will absorb oil or something of that sort, and does not disclose anything

(Testimony of Sydney F. Duncan.)

about the use of wire screen or screen members in which, when oiled, the mesh will remain open.

Q. You have indicated that element VI in claim 4 is absent from Slauson. What is your reason? Is your reason the same?

A. Since there is no screen, there can be no passages with screens.

Q. And you have indicated that element VIII is absent from Clauson, What is your reason for that?

A. For the same reason.

Q. The next column is entitled "Orem." You have [944] indicated that item IV of claim 4 is absent from Orem. Will you state the basis of that opinion?

A. The construction here, according to the drawings, at least, is slightly similar to the Henshall patent in that such subdivision of the air stream as might possibly be conceived to occur is in the form of several concentric, annular spaces, and one interpretation of the drawing, including all the arrows and his statement that the air may flow through the screens, when it is clean, and down along this cylindrical screen to a hole at the end, and carry into a kind of a plenum chamber and then back through some other annular space, if the screen were entirely plugged with dirt, as it might be under prolonged operation, there would really be only one passage through the filter, and that would have to be through each one of the concentric annular spaces in series.

The Court: Well, if all the screens in the Farr

(Testimony of Sydney F. Duncan.)

were plugged with dirt, there would still be multiple passages?

The Witness: 62,000 passages, more or less.

By Mr. Leonard S. Lyon:

Q. Now, you have indicated that item V is absent and that item VI is absent and item VII is absent from the Orem patent. What is your basis for those opinions?

A. Very much as I explained before. This filter constitutes a one-passage which is bent back and forth on itself, so to speak, and air simply passes through this passage along [945] the surfaces of screen and can, under conditions of clean screen, flow from one portion of the passage to another portion of the passage through the screen wall.

So, in the teaching of the Farr patent, where there are many passages parallel to each other in effect through the filter, this construction described by Orem does not, in my opinion, meet these requirements. [946]

Q. Your next column is entitled "Merriweather." You have indicated that Item 4 or Claim 4 of the Farr patent is not found in the Merriweather prior patent. What is the basis for that opinion?

A. The opinion here with respect to Merriweather and the multiple subdivision in two dimensions is the same as for the Henshall patent under the same problem.

The screens or frames in wire gauze—he refers to them as screens 23 and wire gauze 23-A—form

(Testimony of Sydney F. Duncan.)

subdivision in only one dimension of the panel rather than two. So the answer there must be no, since it is not in both dimensions.

Q. You have indicated that Item 7 of Claim 4 is not found in Merriweather. What is the basis for that opinion?

A. The passages being formed by the wire gauze 23-A in the frames and set parallel to each other do not change direction from the beginning of the passage to the end of the passage, so there is no change of direction in the passage itself.

Q. The next column under the title "Kaiser" you have set forth that you do not find Item 3 in Claim 4 in the Kaiser patent. What is the basis for that opinion?

A. The Kaiser patent teaches that the material should be paper and as such it is relatively impervious to the flow of air and it doesn't take on the characteristic of a screen at all. [947]

The Court: You saw that example made today and produced by Mr. Brown, did you?

The Witness: Yes.

The Court: Of screen?

The Witness: Yes.

The Court: And do you not think that that conforms to the teachings of the Kaiser patent?

The Witness: No, I do not, your Honor.

The Court: Solely because it is made out of screen instead of paper?

The Witness: Well, by so doing he introduced a new factor in the operation of that device as a filter.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. What new factor of operation would the device have?

The Court: It is screen wire instead of paper. In other words, it provided a turbulence for the air to flow through the interstices of the wire and flow through the passages?

The Witness: That is right.

By Mr. Leonard S. Lyon:

Q. What else, with reference to the loading of the device?

The Court: Loading?

The Witness: I think he refers to the progressive loading shown by those photographs of the filter. [948]

By Mr. Leonard S. Lyon:

Q. In that respect, does the Farr filter have a mode of operation that is not had by the paper filter of the Kaiser patent?

Mr. Harris: Now is counsel referring to the paper filter as made by the Kaiser patent or to the Kaiser type filter made of screen wire?

Mr. Leonard S. Lyon: If this screen wire device existed in the prior art, your Honor, there wouldn't be any law suit here. This is not a device that is in the prior art and our argument is that it is not merely a change of material.

\* \* \* \* \*

The Court: That was given in the answer to your previous question.

The Witness: I thought so. [949]

(Testimony of Sydney F. Duncan.)

The Court: The turbulence of the air and the flow of the interstices of the screen, the change of direction, and so forth.

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. And the progressive loading.

The Court: Progressive loading.

The Witness: Yes, your Honor.

The Court: What else about the Kaiser patent?

Mr. Leonard S. Lyon: Item 8 I think is explained in his answer.

The Court: Yes.

By Mr. Leonard S. Lyon:

Q. Returning now to the Manning patent, you have indicated that the same elements are absent from the Manning patent as are absent from the Kaiser patent. Is your opinion based on the same reasons in the case of the Manning patent?

A. Yes, they are. The Manning patent teaches paper and impervious walls to the passages.

Q. Next we have reference to the Wood patent. You find Item 3 of Claim 4 absent from the Wood patent. What is the basis of your opinion?

A. The Wood patent discloses a number of devices, most of which are intended to catch and drain off some entrained liquid in an airstream. This catching of an entrained liquid [950] will also collect such dust as may be in the liquid and give some air cleaning. But the only thing that would be classified by me as a panel type air filter operating on the principle of impingement is shown in

(Testimony of Sydney F. Duncan.)

Figs. 12, 13, 14 and 15 of the Wood patent. In the description of these figures there is no mention made of making this filter out of mesh screen members; therefore the answer to No. 3 is no.

Q. What is the basis of your answer that element 6 is absent?

A. Well, there is no screen so how can the walls be made of screen?

Q. What is the basis for your opinion that Item 7 is absent?

A. All descriptions of this filtering device describe only straight crimps. There is no change in direction of the crimp or change in direction of the passages as formed by the crimps.

The Court: And impervious material?

The Witness: And it is impervious material.

The Court: Either paper or sheet metal?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. And that explains the reason for your statement that Item 8 is absent?

A. Item 8 is absent.

Q. In the next column you have set forth your findings [951] with respect to the presence of the element in the Farr patent in suit? A. No.

Q. I don't mean in suit, in evidence. You state that Item 7 and Item 8 are absent and under Item 1 that this patent does not disclose a filter panel operating on the impingement principle. Will you state the basis for your opinion as to the absence of those three items?



(Testimony of Sydney F. Duncan.)

A. To make clear the term impingement, the rotor shown in Fig. 3 and, as I believe it says in Fig. 1, it turns and the lower portion of it dips into a tank of water which is either 14 or 15 in Fig. 1. Such dust as may have accumulated on it during its revolution will be washed off by the water and the device will present a continuously relatively clean surface to the air. So in distinguishing between this and a filter panel, a panel filter collects the dust and holds it until sometime after a period of perhaps months it is taken out and cleaned by some other than a built-in agency.

So that is the reason why in the Farr patent '480 I say no, it is not a filtering panel.

Q. I believe you have already testified that you have been familiar with the manufacture of the evaporative devices under this Farr patent, have you not? A. Yes, I have.

Q. In operation, how fast does the device rotate?

A. Just about one-half revolution a minute, so that about every 40 seconds a particular spot on the rotor is dunked in the tank of water.

Q. I show you Plaintiff's Exhibit 26. Can you identify what that is a picture of?

A. This is a picture of one of the rotors built according to the Farr '480 patent.

Q. You have indicated on Exhibit 32 that Item 7 of Claim 4 is not present in that device. Can you demonstrate that fact by this Exhibit 26?

A. On Exhibit 26, which was taken against a fairly light background, it is possible in an area

(Testimony of Sydney F. Duncan.)

just near the center of the photograph to see straight through the crimps. That rotor is six or eight inches thick in a direction perpendicular to the plane on its face.

At other points in the photograph it will not be possible to see through the crimps on account of the angle of view.

Q. Can you see through it only at one point in the device or at a plurality of points?

A. You can see through it at any point of the device from the hub to the outside depending upon the direction you look.

The Court: In other words, you can see through it wherever you are looking through it?

The Witness: Right, your Honor. [953]

By Mr. Leonard S. Lyon:

Q. Now the next column on this page of Exhibit 32—

The Court: You say this does not work on the impingement principle?

The Witness: No, your Honor. I said that it would collect dust, such duct as it would collect will be by the impingement principle, yes, but it doesn't store it like a panel filter does. And that is the reason Claim 8 has a "no" on it.

Mr. Leonard S. Lyon: You mean Item 8?

The Witness: Item 8 under Claim 4 has a "no," because it is continuously washed and the plugging situation does not exist.

The Court: The impingement then does not occur against the screen material because of any

(Testimony of Sydney F. Duncan.)

viscous coated material but because the screen is damp, is that it?

The Witness: Well, impingement means that something hits something else, and whether the screen is coated or not, dust particles must impinge thereon. If there is an adhesive, such as oil, then a dust particle impinging on the surface of the screen wire can be caught and held. To a certain extent water will act as an adhesive but in this device, in the Farr '480 patent, the water is continuously evaporating so that it doesn't present much of an opportunity to catch dust particles.

The Court: That water itself catches the dust particles? [954]

The Witness: The water itself catches the dust particles and holds them.

The Court: In other words, the idea is to have the water dripping through so that the air passes along the water and comes back down?

The Witness: The water doesn't drip in this device, it simply coats the screen and evaporates from the surface.

The Court: Does it not say there in the patent some place that as it goes around it trickles down and around?

Mr. Leonard S. Lyon: That is a different patent.

The Court: I thought it was this one.

The Witness: It doesn't say that it trickles down around and through.

(Testimony of Sydney F. Duncan.)

The Court: Well, maybe you have a fancy word for "trickles."

The Witness: The direction of the crimp provides——

The Court: Well, on page 1, column 2, line 10, it states: "in this way (this is after describing it) the air current passing through the purifier will be baffled and broken up, as it were, so that all the molecules of air passing through the purifier must come in contact with the moisture-laden areas."

The Witness: Speaking of the then water coating on the surface of the wire.

The Court: "In practice this effect is practiced preferably [955] by providing a reticulated body, the lower edge of which dips into a bath of liquid or water and as the purifier rotates its wetted upper portion carries a considerable quantity of water which continuously gravitates downwardly"—that is what I meant by trickle—"gravitates downwardly so that all of the reticulated areas of the purifier carry moisture to contact with the flowing airstream passing through the purifier."

It does not stay down, it runs along the edge.

The Witness: It runs along the surface of the wire and that action takes place principally where the rotor is emerging from the bath of liquid.

The Court: What is meant in all these patents here in your opinion where it says that the impingement principle is used? Does that not mean that the dust particles impinge upon the screen or whatever it is that is coated and stay there?

(Testimony of Sydney F. Duncan.)

The Witness: That is right, and opposed to the filter paper type of action, of filtering where the hole through which the air can pass is smaller than the particle approaching the filter paper.

The Court: That is where they are introduced at right angles to the filter paper?

The Witness: Yes.

The Court: But if it is introduced through these—— [956-957-958]

The Witness: As in the Kaiser and Manning?

The Court: As in the Kaiser and Manning.

The Witness: Then it is operating on the impingement principle.

The Court: In other words, by “impinging” it means to hit and stick?

The Witness: Well, hitting is sufficient for impingement. That is the distinction.

The Court: What is the use of having the dust hit it if it does not stick?

The Witness: That is why we oil our filters.

The Court: How do you describe that other than using the word “impingement”?

The Witness: The dust certainly impinges on the outside surface and sticks; yes, your Honor.

The Court: But it does not on the Farr '480 patent?

The Witness: It does not stick very well.

The Court: It sticks long enough to be taken down into the water bath?

The Witness: Some of it does.

The Court: Very well.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. The next column, which is labeled "Row (British)," you have indicated that that is not a filter panel operating on the impingement principle. What is the basis of your [959] opinion as to that?

A. The teachings of the Row patent——

The Court: Did you skip the Kirkham patent? No, that comes next. I have my book wrong. Go ahead.

The Witness: In Figure 3, particularly of the Row patent, there is a little pipe H up at the top which delivers water to a kind of pan on top of the unit. The patent teaches that water seeps out of this pan and flows down the various kinds of surfaces that Row interposes between the top and the bottom of his device, and that the seeping of water continually cleans the surfaces of dirt and the pipe I at the bottom of Fig. 3 is described as an overflow to prevent flooding. [960].

The Court: Does the water, droplets of water or whatever you call them, act there to gather upon themselves the dirt that is in the air?

The Witness: Just the same as in the Farr device.

The Court: Well, what I am trying to get at is that when it rains it cleans the air. Now, that isn't just because it settles the dust on the ground, but because the water coming down gathers the dust as it passes through the air, does it not?

The Witness: Yes.

(Testimony of Sydney F. Duncan.)

The Court: Well, does it do the same thing in the Farr rotary device?

The Witness: Except that we don't have the droplet situation existing.

The Court: Does it do the same thing here in the Row device?

The Witness: Yes. The water will collect dust out of the air.

The Court: Go ahead.

By Mr. Leonard S. Lyon:

Q. Now, you have indicated that item III—that item IV is not present in the Row device. What is the basis of your opinion as to that?

A. Well, at no place in the Row device does he teach other constructions than parallel plates or something or [961] other. Although these plates may be bent, there is no subdivision except in one dimension. Lines parallel to the edges of one of these plates, such as shown in Fig. 1 or Fig 3 or taking into account the direction of air flow in Fig. 2 of the front edges of those plates, would present a series of straight lines up and down the device, and so there is no subdivision in two dimensions—only one.

The Court: Well, suppose that the plates shown in Figs. 1 and 2 were made of the material shown in Figs. 7 and 8, then wouldn't the flow be in two dimensions?

The Witness: There would be no subdivision if the plates of 1 and 2 were made of the material of 7, 8, 9, and 10—well, we should say 7 and 9.

(Testimony of Sydney F. Duncan.)

The Court: 7 and 9?

The Witness: Then we would have a device which would be similar to Merryweather with the addition of a change in direction, that is, if you use Fig. 2 as an example.

By Mr. Leonard S. Lyon:

Q. You have indicated that element VIII of claim 4 is not found in the Row patent. What is the basis for that opinion?

A. The teachings of the Row patent being that the water shall keep it clean, renewing the water on which the dust may collect, there is no progressive loading or change of flow through the device from time to time. [962]

Q. Now, the next column has reference to the prior Kirkham British patent. You have indicated that that is not a filter operating on the principle of impingement. Is your reason the same in the case of the Kirkham patent as you gave in the case of the Row patent?

A. And the Farr '480 patent, yes. This is described as being a gas scrubber.

Q. What is the difference between a gas scrubber and a panel filter operating on the impingement principle?

A. Well, the panel filter similar to the patent in suit collects dust and holds it until some considerable time later it is cleaned, whereas, in the gas scrubber described, the usual engineering understanding, so to speak, is to bring some liquid in contact with some gas so that a portion of the gas



(Testimony of Sydney F. Duncan.)

may be dissolved in the liquid or that a portion of the liquid may be vaporized into the gas stream.

Q. Now, you have indicated that element III of claim 4 is not found in the Kirkham patent. Do you find in the Kirkham patent any reference to the mesh screening members?

A. There is a reference to wire gauze on page 2 of the patent, the paragraph beginning at line 9. It says:

“According to our invention we make use of sheets of corrugated metal or wire gauze, which may be laid one against the other or against flat boards or other surfaces,” and so on. [963]

There seems to be no intention in the patent of having this material of coarse mesh, and while the exact definition of “wire gauze” is unavailable, probably, perhaps non-existent, the general connotation of the term is “material of rather fine mesh.”

And so, in the teachings of the Farr patent that the mesh of a screen material, the woven wire material must be sufficiently open so that when oiled air may flow through the openings, I have put a “no” down under the “mesh screening members” of the Kirkham patent.

The Court: Well, isn't the air compared as a form of gas——

The Witness: Yes.

The Court: ——in your business?

The Witness: Yes.

The Court: Now, if I understand you correctly, the principle of the Kirkham patent and the Row

(Testimony of Sydney F. Duncan.)

patent by which the air is cleaned is by the use of water.

The Witness: That is correct.

The Court: To clean the air.

The Witness: That is correct.

The Court: And these are devices to bring drop-lets or mists of water in contact with the particles in the air?

The Witness: Not necessarily mists, but water.

The Court: Well, not necessarily mists, but some kind [964] of water. So that the water operates as the media for collecting the dust.

The Witness: Yes, sir.

By Mr. Leonard S. Lyon:

Q. You have indicated that the last three elements, Nos. VI, VII, and VIII of the claim 4 of the patent in suit, are not found in the Kirkham patent. Will you state the basis for those opinions?

A. Item VI, "the walls of which passages are composed of such mesh members." For instance, he speaks of "wire gauze," and in general practice that is characterized to almost any engineer as being a fine material which would be plugged by dipping it in oil, since the passages are not of sufficiently open nature to pass air, so then, automatically, items IV, V, and VI—well, excuse me—VI and VIII are "no."

In item VII I find no change in direction of any crimps in the Kirkham patent, so the answer is "no."

Mr. Harris: If the Court please, I move to

(Testimony of Sydney F. Duncan.)

strike the portion of his answer saying that any engineer would know. I think he can state what he would know or what his opinion would be, but to give an opinion as to other engineers, I think that should be stricken.

The Court: All of his testimony here is his opinion, his opinion as to what any engineer would know. [965]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Continuing with Exhibit 32, Claim 4, the next column refers to the Moller (British) patent, and you have indicated on the exhibit that you do not find the first element of Claim 4 in that patent.

Are your reasons the same in that instance as they were for your similar conclusion with respect to the Row, Kirkham and Farr evaporator patents?

A. Yes, they are, since this is a device which is continuously washed and under these conditions the dirt does not build up in the filter or it is not loaded over a long period of time but it is rather clean quite frequently.

Q. You have indicated that you do not find the third element in the Moller (British) patent. What is the basis for that opinion?

A. I find no place in the patent where it describes [973] the construction of mesh screening members. The patent describes them embossed or——

Q. You have next indicated that you do not find the sixth element of Claim 4. Is that based

(Testimony of Sydney F. Duncan.)

on the same reasoning that you just gave with respect to the third element?      A. Yes.

Q. And you indicate that you do not find the last element in the moller patent. Will you state the basis for that opinion?

A. The last element calls for flow through the members and these members of the Moller patent are made out of sheet metal and therefore there can be no flow through them, only between them.

Q. This last element of Claim 4 calls for what you have referred to in your testimony as the progressive loading mode of operation.

A. Yes, it describes it.

Q. Now the last column on this page of Exhibit 32 sets forth your findings with respect to the prior Niestle (French) patent, and you have indicated in the first place that you do not find the second element of the Niestle (French) patent. You do not find the second element of Claim 4 present in the Niestle patent. Will you state the basis for that conclusion?

A. The sheets of deformed screen or expanded metal [974] type of screening material in the Niestle patent lie perpendicular to the direction of the flow of air.

Q. Will you demonstrate that to the Court with the model of the Niestle patent which the defendant produced, Dr. Rowley?      A. Exhibit CC.

The Court: There were two. Mr. Brown introduced one.

(Testimony of Sydney F. Duncan.)

The Witness: Exhibit CC is the sheet of screen that has been deformed.

Mr. Leonard S. Lyon: I want you to demonstrate your answer with the model of the Niestle filter.

The Witness: That is Exhibit YY.

Mr. Leonard S. Lyon: We don't recognize this as a Niestle patent device, your Honor.

The Court: Dr. Rowley produced one that was all full of soot.

The Witness: That is Exhibit LL.

Mr. Leonard S. Lyon: We can put both Exhibits YY and LL in front of the witness and he can refer to them in his answer.

The Witness: And may I have CC?

Mr. Leonard S. Lyon: What is that?

The Witness: That is a piece of screen wire that has been expanded.

(The exhibits referred to were passed to the witness.) [975]

The Witness: Exhibit YY is a 7 x 7 sample of a Niestle filter and Exhibit CC, although it is made of 30 mesh instead of 16 mesh screen, is an example of the sheets that were used to make Exhibit YY.

The sheet of screen deformed as it is in Exhibit CC is placed in the frame of Exhibit YY parallel to the face of the frame so that the sheet or the plane of the sheet of deformed screen is perpendicular to the direction of air flow.

As viewed through the window——

(Testimony of Sydney F. Duncan.)

The Court: In other words, the air flows at right angles?

The Witness: At right angles to the plane of the sheeted screen.

As viewed through the window of Exhibit YY, it appears that there are six of the sheets similar to Exhibit CC used in making Exhibit YY and each one of them is at right angles to the air flow. By Mr. Leonard S. Lyon:

Q. You have indicated next on Exhibit No. 32 that you do not find in the Niestle patent the third element of the fourth claim of the patent in suit, to wit, "mesh screening members." What is the basis for that opinion?

A. In the sense in which "mesh screening members" is used in the Farr '479 patent, the requirement is that the apertures of the screen shall be open when oiled, so that air may flow through them. I find no such teaching in the Niestle patent because he repeatedly refers to the mesh of the screen, or the holes in the perforated plate, which he states is an alternate construction, as being small enough so that they shall fill with oil completely, and in one place he says, "to fill the meshes by capillary action."

The Court: "... and form a continuous, thick film of oil, favoring the deposition of the dust suspended in the gas."

The Witness: Yes. On my typing of the translation I can't refer to lines in it because I think it is different from the one in evidence.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. You have indicated in Exhibit No. 32 that you do not find the sixth element of claim 4. Is your reason for that the same as the reason that you have just given for your finding that the third element is not present? [977] A. Yes, it is.

Q. You have indicated on Exhibit 32 that you do not find in the Niestle patent the progressive loading called for by the eighth element of claim 4. What is the basis for your opinion on that point?

A. Since the Niestle patent teaches that any holes in the material used shall be filled with oil, there can be no flow through the holes, and, therefore, the feature of progressive loading described by element VIII is not present in the Niestle filter.

Q. Referring now to Exhibit YY or LL, for example, do those exhibits illustrate, in your opinion, a practical filter? A. No. They don't.

Q. Why not?

A. There are many difficulties in getting such a construction to stay together in the alignment intended by the patent. This is evident in Exhibit YY by the fact that it was found necessary to apply soldering at many points to hold one screen layer in position against another screen layer.

In Exhibit LL, the dirt deposit, as I observed, hides any such soldered places, and so I do not know whether they exist in Exhibit LL. There is apparent, on the upstream face, some misalignment, but on the downstream face of Exhibit LL there are again a few evidences of soldered places where

(Testimony of Sydney F. Duncan.)

it was necessary to do some soldering to keep this thing together, [978] in the shape taught by the patent.

Q. Then, in your opinion, would it be practical to manufacture a filter like Exhibit LL or YY?

A. No. It would not.

Q. Do any of the prior-art patents that you have referred to on Exhibit 32, in your opinion, disclose a filter having the mode of operation of the Farr patented filter?

A. Well, there are some of the filters which show the progressive loading, but taking the total mode of operation as previously described, I do not find one which coincides with the mode of operation of the Farr filter.

Q. Do any of the prior patents disclose a filter which, in your opinion, would have the characteristic performance which you have explained as had by the Farr patented filter?

A. No. I don't think so. [979]

\* \* \* \* \*

Q. Do you find in any of the prior patents referred to in Exhibit 32 the combination of elements set forth in claim 4 of the Farr patent in suit?

A. No, I don't.

Q. On the succeeding pages of Exhibit 32, have you set forth the elements of claims 5, 7, and 8 of the Farr patent in suit which you find present or absent in the accused P-5 device and in the various prior references in evidence in this case?

A. Yes, I have.



(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: At this time, your Honor, I will offer in evidence Exhibit No. 31, which the witness produced on direct examination, and I will offer in evidence Exhibit No. 32. No. 31 is a curve sheet.

The Court: All right. Admitted. Both of them are admitted.

(The documents referred to, marked Plaintiff's Exhibits Nos. 31 and 32, respectively, were received in evidence.)

[Printer's Note: Plaintiff's Exhibits 31 and 32 are reproduced in Book of Exhibits.]

Mr. Leonard S. Lyon: You may cross examine.

The Court: No. 30 was admitted yesterday.

Mr. Leonard S. Lyon: Yes, your Honor. [980]

### Cross Examination

By Mr. Harris:

Q. Mr. Duncan, I believe you stated that you had testified as an expert for the Farr Company in a prior action entitled Air-Maze Corporation, et al., vs. Temperatair, Inc., and the Farr Company, No. 2529, Civil, in this court, is that correct?

A. I don't remember the number, but I did.

Q. That was a case before Judge Yankwich.

A. Yes.

Q. Do you have the book of prior art before you? A. Patents?

Q. Yes. A. Yes.

(Testimony of Sydney F. Duncan.)

Q. I want to read you some of your statements that you made in the court in the prior case.

First at page 127 of the record in that case the following question was asked you and the following answer was given by you:

“Q. Will you now refer to the patent to Saint Cyr, 1,118,237, and compare the disclosure of that patent with the Greene patent in suit?

“A. In the patent to Saint Cyr, No. 1,118,237, we have a device for, as he says, ‘a device for mixing vaporizing liquid fuels and the object [981] thereof is to provide simple and efficient means for rapidly and perfectly vaporizing and mixing the fuel.’ The vaporizing element is made up of these alternate flat and corrugated screens wound spirally to form a solid pack”——

Do you still agree that in the St. Cyr patent it is made up of alternate flat and corrugated screens which are wound spirally to form a solid pack?

Mr. Leonard S. Lyon: Do you mind if the witness has his testimony before him?

Mr. Harris: Not at all.

Mr. Leonard S. Lyon: It is a little difficult to follow just by hearing it.

Mr. Harris: I only have the one copy.

(The transcript referred to was passed to the witness.)

The Court: Page 123?

Mr. Harris: 127, if the Court please.

The Witness: Yes, the material described in St. Cyr is known as screen.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Then going on your answer to that same question:

“The special corrugations must be made in such a manner that they cannot nest one into the other. And so, in Figure 3 and Figure 4 are shown the [982] type of corrugation that he suggests. The purpose of the corrugation is to space the layers of wire gauze and allow the air to flow down through the device—rather, the air gasoline vapor droplet mixture to flow down through the device in a direction roughly parallel to the layers of screen.”

Do you still agree that in the St. Cyr device the flow of the gasoline vapor droplet mixture is in the direction roughly parallel to the layers of the screen?

A. Roughly parallel to the layers of the wire screen or gauze.

Q. Then on page 128 of that transcript, continuing your answer to the present question, you said:

“The action of the device is described as being to collect the droplets of moisture, the droplets of gasoline on the screen, and as the unsaturated or the lean mixture flows by, to allow them to evaporate into the gas stream. It would act as a filter in that if it collects droplets of moisture it would also collect particles of dirt.”

Do you agree that the device shown in the St. Cyr patent would act as a filter?

A. In the sense used in this quotation, yes.

(Testimony of Sydney F. Duncan.)

Q. First of all, the same Farr filter panel was [983] involved in that suit as is involved here and as is shown in the '479 patent in suit here, was it not? A. Yes.

Q. Now, then, on page 129 of that transcript you were asked this question:

“Q. How does the disclosure of the Saint Cyr patent compare with the filters manufactured by defendant, such as the Farr filter, which is Plaintiff's Exhibit 2 here?

“A. There is a considerable degree of similarity between the two, that is, in the Saint Cyr the air flows roughly parallel to the plane of the screen, and in the Farr filter the air also flows roughly parallel to the plane of the screen.”

Is it still your opinion that the St. Cyr patent is similar to a considerable degree to the Farr filter here in suit?

A. Yes, in these respects that you have read to me.

Q. Then at the bottom of that page 129 and following on to page 130 of the transcript in that case you were asked the following question:

“Q. What is the function, in the Saint Cyr patent, or benefit that is obtained by angling the crimp with respect to the direction of the air flow, in the form shown at Figure 5, where that [984] angle is employed?

“A. Figure 5 is, of course, a developed view of the screen before it is wrapped up. The assembly is shown at Figure 9 or Figure 2.

(Testimony of Sydney F. Duncan.)

“The Court: It does show, however, the corrugations to be on the same screen?

“A. The corrugations are in the same screen, yes. There is one piece of screen corrugated. But the question related to the reason for the angle as shown in Figure 5, and the purpose of the angle is to assure a change in direction of the air flow as the air and vapor mixture flows down through the device. It will give better impingement of the particles or droplets on the screen to prevent the particles from going right straight through without having an opportunity to impinge on a screen, giving a chance to revaporize.”

Now is it still your opinion that the purpose of the angle of the corrugations in the St. Cyr device is to assure a change in direction of the air flow as the air and vapor mixture flows down through the device?

A. The change in direction occurs at the entrance to the spirally rapid screen part of the device. The screen pack is shown installed in a round pipe in Fig. 1—— [985]

The Court: Completely enclosed?

The Witness: Completely enclosed—and a round pipe comes up to the end of that screen pack affair. There the air is flowing roughly parallel to the axis of the pipe as it enters the passages of St. Cyr and it changes direction and impingement can take place at the entrance.

By Mr. Harris:

(Testimony of Sydney F. Duncan.)

Q. Those passages themselves change direction from one face to the other, do they not?

A. More or less continuously and gradually because of the fact that they are wrapped up in spiral form.

Q. On page 131 of the transcript that I am referring to you were asked the following question and gave the following answer:

“Q. The Saint Cyr patent uses the term ‘wire gauze’ as describing woven wire members. What is your understanding of the meaning of the term ‘wire gauze’?

“A. As far as I know wire gauze is not accurately defined.”

Would your answer be the same if you were asked that question today?     A. Yes.

Q. On the same page you were asked this question and gave this answer: [986]

“Q. May wire gauze be employed for the purpose of dust filtering?     “A. Yes, sir.”

Do you still have that opinion that wire gauze may be used for dust filtering?

A. Yes. The commonest application is in taking dust particles out of gasoline in carburetor flows in which the gasoline flows through the meshes of the wire gauze entirely without any opportunity to do anything else.

Q. Then on page 131 of the transcript in the prior case you were asked the following question and gave the following answer:

“Q. How does the size of the openings in the

(Testimony of Sydney F. Duncan.)

wire gauze compare with the size of the dust particles?

“A. Assuming that wire gauze starts at 100 mesh, that would be an opening somewhat smaller than a hundredth of an inch, which would be about ten thousandths or a little less, because we would have to subtract the wire size. And the dust particles that we mentioned before was four ten thousandths of an inch, so that the size of the opening would be roughly twenty-five times the size of the particles that might be expected to collect. The action of the wire gauze would be [987] substantially the same as in other screen members, the difference being in ease of plugging and resistance to flow, rather than in the type of action that would take place.”

Is it still your opinion, Mr. Duncan, that the action of the wire gauze would be substantially the same as in other screen members?

A. If the holes of the wire gauze were not plugged, yes.

Q. Then your opinion would still be that the only difference would be between the ease of plugging and resistance to flow as you have stated it here?

A. Yes. This is a correct statement. But the meshes of the wire gauze have to be open to begin with or else the comparison of particle size versus hole size is meaningless.

Q. Now on page 134 of that transcript you were asked the following question:

(Testimony of Sydney F. Duncan.)

“Will you now refer to the disclosure of the British patent to Row, No. 13,22, and compare the disclosure of that patent with the patent in suit?”

Then came several questions and answers——

The Court: That is, as compared to the Greene patent?

Mr. Harris: As compared to the Greene patent; yes, sir.

The Court: Was the present patent in suit involved in that case also? Had it been issued? [988]

Mr. Harris: It had been issued but it wasn't involved directly except that it was the '479 type of filter which was charged to infringe in that suit, to infringe the Greene patent that was there being sued on. The Greene patent is owned by the Air-Maze Corporation.

The Court: Yes, I understand.

Mr. Harris: And they were suing the Farr Company for——

The Court: And the Farr Company were defending on invalidity of the Greene patent?

Mr. Harris: Invalidity and lack of infringement, I think the pleadings show that are here in evidence. The pleadings in that case are in evidence here.

The Court: Yes, I know they are.

Mr. Leonard S. Lyon: Judge Yankwich held the Greene patent valid but not infringed. I believe that was it.



(Testimony of Sydney F. Duncan.)

The Court: Did he pass on the validity of the '479 patent?

Mr. Harris: No, that was not involved in that case. The '479 patent itself was not involved there because it was not being sued upon at that time.

Mr. Richard S. Lyon: The Farr patent that is here in suit was in that case just as the Schaaf patent is in this case, but Judge Yankwich didn't find it necessary to make any ruling as to whether the Farr patent was valid or not. He simply found the Farr device didn't infringe the Greene [989] patent.

The Court: Very well.

By Mr. Harris:

Q. So on page 134 of the transcript you were asked that question with regard to the Row (British) patent, and then follows several answers and additional questions which I won't read, but going over to page 136 of the transcript the following statement and answer was given:

"The Court: Mr. Clerk, I think you can probably attach it. Go ahead.

"A. In describing the various possible methods by which Mr. Row's object could be obtained, he hit upon a number of different schemes for subdividing the airstream and causing it to impinge upon a wetted surface. He thought of using rods and chains and foranamous plates of various types, such as perforated plates and expanded metal. He suggested the use of woven wire cloth and of a kind of woven flat strip structure, as well as

(Testimony of Sydney F. Duncan.)

smooth plates corrugated and spaced one from the other.”

Is it still your opinion that the Row (British) patent teaches a number of ways of causing an airstream to impinge upon a wetted surface?

A. Yes. [990]

Q. Now on page 138 of the record, still testifying as to the Row (British) patent, I will start reading in line 15, your answer in line 15 on that page:

“A. \* \* \* He also discloses the use of spaced flat screen members, with the flow of air either through the screen members or roughly parallel to the screen members, as an air filtering and cooling medium.”

It is still your opinion that Row discloses a flow of air either through the screen members or roughly parallel to them as an air filtering and cooling medium? A. Yes.

Q. Then you went on to say:

“The disclosure of the fundamental principles of operation of an impingement type filter are very clearly set forth in Mr. Row’s patent.”

Do you still agree that that is the situation?

A. I have no quarrel with that statement.

Q. Now, then, referring to your prior art chart, Exhibit 32, under the column entitled “Row (British)” you have a no opposite I in the left margin. In view of your statement just now——

A. Excuse me. Is this Claim 4?

Q. Claim 4, yes.

(Testimony of Sydney F. Duncan.)

What you do mean by the "no" that you have there opposite [991] that element of the claim?

A. I was looking at the wrong column. Just a moment. Claim 4?

Q. Claim 4, element I, Row patent, where it says "no." What do you mean by that?

A. It is disclosed in the Row patent that the water tank at the top of the device shall allow water to flow slowly down the plates, whatever they may be, whether chains of bars or woven wire or what have you, and that this then does not constitute a panel type of filter of the types presented in testimony here because it is continuously cleaned by the water flow, and this teaching is also contained in the Row patent.

I never contended that Row did not allow the impingement to take place, but a filter panel operating on the principle of impingement of particles on collected surface, as we have used these surfaces all through our discussion, these are filters which collect the particle when it impinges and keeps it for a long time compared to the amount of time that Row keep it. He keeps washing it down all the time.

Q. But so far as the removal of the dust from the air is concerned, the Row construction is an impingement type filter, is it not?

A. Particles impinge on the surfaces of the Row structure; yes. [992]

Q. And are collected there until they are washed away by the water?           A. Yes.

(Testimony of Sydney F. Duncan.)

Q. So that in the Row patent the water has two functions: first of all, it assists in the collection of the dust, the removal of the dust from the air and, secondly, it washes the dust off the filter area, does it not? A. It does.

Q. Now you know that oil in impingement type filters is a better collecting or dust-catching agent than water, do you not? A. Yes.

Q. You knew that prior to 1939?

A. I suppose I did. I should have. Certainly.  
By Mr. Harris:

Q. Now, suppose you had this Row patent and you did not care about humidifying the air. That is one of the functions of the Row patent, is it not?

A. Yes.

Q. Suppose you did not care about humidifying, all you cared about was dust collection, wouldn't it be an obvious thing for you to do to substitute oil for the water that is shown in the Row patent? [994]

\* \* \* \* \*

Mr. Harris: I will add this to the question:

Q. Wouldn't it be obvious to you to coat the surfaces of the Row patented device with oil instead of having water always down over them as shown?

A. I am not entirely sure whether it would have been obvious to me in, say, 1939. At the present time it seems obvious enough to me that using oil in place of water on a filtering device where flow does not take place——

(Testimony of Sydney F. Duncan.)

The Court: That is flow of what, flow of oil or water?

The Witness: Continuous flow of the adhesive, whatever it may be, that oil would give superior properties. In a device where, as it does in the Row patent, continuous flow takes place, water is so much more convenient that perhaps by increasing the depth of the filter or something, I would accomplish the same thing. A continuous flow of oil in the Row patent would require pumping it back up to the top, whereas the slight water overflow at the bottom can be wasted into the sewer.

So, if I may split my answer in this way, since you split your question, according to the building of the Row patent and substituting oil, while it might occur, to me would not appear to be favorable. Just spraying the panels of Row with oil and [996] throwing out the humidifying effect that he talks about, that appears to me to be a reasonable substitution, something that I could have easily thought of.

By Mr. Harris:

Q. The reason you qualified it as to 1939 is that at that time you were not as familiar with these panel filters as you are now, is that correct?

A. Well, no.

Q. It is not correct, or it is correct?

A. Oh, excuse me. No. I was not as familiar in 1939 as I am now.

Q. If you had your present knowledge in 1939, your answer would be the same, is that correct?

(Testimony of Sydney F. Duncan.)

A. I think so.

Q. Now, the same thing is true, is it not, of the Farr '480 patent construction, that if you wanted to use that as an air purifier, dust-removal device instead of the combination of dust removal and humidifier, then, the substitution of the dipping of that panel in oil would be an obvious expedient—the substitution of oil for water?

A. In the filter as it stands in the '480 device?

Q. Yes.

A. As it stands, or do we have the same split as we had with the Row question?

Q. Well, using the filter media as shown in the '480 [997] patent, if you wanted to use that simply as an air filter, it would be an obvious expedient to dip that panel in oil?

The Court: You mean to wash out the water apparatus?

Mr. Harris: Yes.

The Court: And just dip the gauze in oil?

Mr. Harris: Yes.

The Witness: Without the washing?

Mr. Harris: Yes.

The Witness: That would be a logical thing to do. Take the screen media of the '480 patent, and if you want to use it for a filter, it will eliminate a lot of difficulties if you just dunk it in oil and let it drain and then put it in place to act as a filter. The passages are pretty big and you can see straight through them, but it would catch dust.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Now referring again to the Row patent, you have indicated "no" opposite the Roman numeral VIII as to Claim 4 on Plaintiff's Exhibit 32; yet, opposite VIII under the Merryweather patent you have indicated "yes." How do you reconcile that difference? They are both angle screens, are they not?

A. Yes, they are both angle screens, but in the Merryweather patent this washing feature that I have spoken of is not present.

The screens, if they are oiled, in Merryweather, are [998] dipped once and allowed to plug up before something else happens to them.

In the Row patent, since all of the members are described as being washed, then the dust collection is not the progressive type of thing that I have described as occurring in other devices.

Q. Now, using your direct testimony, it indicates that progressive loading of filter panels of the impingement type was old in the prior art before the patent in suit, does it not?

A. I don't remember saying that.

Q. Well, that is a fact, is it not?

A. Progressive loading was old?

Q. Yes. Well, for example, I refer you to your Exhibit No. 32, Claim 4, under opposite Roman numeral VIII, which you said was the progressive loading portion of the claim; you have indicated that Henshall has progressive loading, that Orem has progressive loading, and that Merryweather has progressive loading, so that progressive loading was old in the panel type filters?

(Testimony of Sydney F. Duncan.)

A. Oh, yes. I was trying to remember a direct answer to that particular question. Oh, yes, in these answers here I have indicated that progressive loading existed.

Q. And all of those patents that I have mentioned show the use of wire screen or screen members for the [999] progressive loading, do they not?

The Court: Which ones? Which patents?

The Witness: Which ones?

By Mr. Harris:

Q. Henshall?

A. No. No screen in Henshall.

Q. Excuse me. Well, which ones do, Orem and Merryweather?

A. Merryweather has wire gauze in it. He is a little confusing about his definitions of screens and wire gauze.

St. Cyr has screen mesh material in it.

Orem——

The Court: Orem what?

The Witness: Orem has screen in it, yes. That is that concentric annular space affair on the intake of a carburetor.

By Mr. Harris:

Q. Now, you have indicated that St. Cyr does not have progressive loading, by the “no” opposite Roman numeral VIII on Plaintiff’s Exhibit No. 32, Claim 4. Is that your opinion?

A. That is my opinion.



(Testimony of Sydney F. Duncan.)

Q. If you put the St. Cyr device in a tube and blew air through it, with dust in it, wouldn't the dust progressively load from the inlet to the outlet?

A. The mesh of the member described in St. Cyr would, in my opinion, have to be fine enough so that, if it were [1000] dipped in oil, it would present a solid surface such as it described in the Niestle patent, and the progressive loading, by virtue of having open meshes, would not take place in the St. Cyr device.

Q. Well, suppose you put a light oil on it, that would not clog the openings, then would it progressively load?

Mr. Leonard S. Lyon: I think that assumes a contradictory situation, your Honor, how you do that. There is no such oil that would not fill what St. Cyr is calling for.

The Court: I understand your question to be, suppose you put an oil on it that was light enough so it wouldn't fill the interstices.

Mr. Harris: Yes, that is correct.

The Court: Would it progressively load? Is that what you asked?

Mr. Harris: That is the question, yes.

The Court: The objection is overruled.

The Witness: If the oil that you propose to use on St. Cyr were sufficiently light so that there were open screen members, or if you rebuilt St. Cyr with 10-mesh screen or something with big holes in it, then the progressive loading could take place at the initial part of the loading of the filter;

(Testimony of Sydney F. Duncan.)

but this is not the teaching of the St. Cyr patent, in my opinion.

By Mr. Harris: [1001]

Q. Now, as to the Kaiser and Manning patents——

The Court: Wait a minute now.

Mr. Harris: Excuse me.

The Court: You said in the St. Cyr. Did you mean St. Cyr or Niestle?

The Witness: I said St. Cyr and referred to Niestle in my answer. The wire gauze in St. Cyr——

The Court: It does not require it to be——

The Witness: ——is not dipped in oil, in application.

The Court: It is not required to be coated under the teachings of the patent to St. Cyr?

The Witness: No.

The Court: But it does in Niestle.

The Witness: Yes.

The Court: Well, I am all confused now. I had in mind that you were asking about the Niestle patent.

Mr. Harris: I am asking about St. Cyr, your Honor. Maybe my question was misphrased; I don't know. We are talking about the St. Cyr construction.

The Court: Well, the St. Cyr construction, as I remember, does not require that the wire gauze be dipped in oil so as to form the solid surfaces.

The Witness: No, it does not.

The Court: In Niestle, it does.

(Testimony of Sydney F. Duncan.)

The Witness: In Niestle, it does. [1002]

My answer to the question was that if St. Cyr were dipped in oil so that it would be the impingement type of filter or resembled the impingement type of filter we are discussing, it would present the same surface that Niestle does, which, when dipped in oil, presents a fully clogged wire gauze area.

By Mr. Harris:

Q. But, that is a matter of selection of the viscosity of the oil, is it not, Mr. Duncan? It is just a matter of selection of proper oil as to whether it clogs the interstices or not?

A. Well, there are two factors. One is the mesh of the screen, and the other one is the character of oil—not only its viscosity.

Q. Those two factors are a matter of selection, are they not?      A. Yes.

Q. You would know, as a man skilled in the art, that if you wanted to use this as an air filter (indicating device)——

A. What is that?

Q. This is St. Cyr, the model Exhibit V—then, the matter of selection of screen mesh size and the matter of selecting the proper viscosity oil would be relatively simple?

A. Let me get that question straight.

The Court: If you wanted to use this as a filter?

Mr. Harris: Yes. [1003]

\* \* \* \* \*

(Testimony of Sydney F. Duncan.)

The Witness: If I had already envisioned the combined flow of either along the passages or through the meshes, then I could experiment very easily to determine how to achieve that result with a given screen and a particular oil or some combination of screen mesh and oil.

By Mr. Harris:

Q. Now, oil dipping isn't required in an impingement filter, is it; you don't have to filter with oil?

A. Well, the ceiling of this courtroom is not coated with oil, and it collects dust, if that is what you mean, but it is a very poor commercial device if it is not coated with some kind of adhesive.

Q. But you don't have to coat any of these filter panels with oil to make them work as impingement filters, do you?

A. Impingement takes place but the dust hardly sticks.

Q. Referring back to the St. Cyr patent, what it discloses, is it your opinion that any dust in the air stream [1004] blowing into it, as is shown in the patent, would not progressively load in that filtering device?

The Court: You mean solely the **air flowing** into it?

Mr. Harris: Just exactly as shown in the patent, with air flowing in, carrying dust, wouldn't that dust in the air be separated out?

The Court: The St. Cyr patent says air and gasoline.

(Testimony of Sydney F. Duncan.)

Mr. Harris: Yes, but the witness testified that this construction of St. Cyr would catch dust as well as the droplets of gasoline.

The Court: Yes.

Mr. Harris: And I want to know what the manner of that dust catching would be, and I am suggesting to the Court it would be the same general type of progressive loading that you referred to here in your testimony, is that correct?

The Witness: I am not sure, for this reason, that I still maintain that it depends upon the mesh of screen. Now, if you have dry screen and air can flow through the meshes and we assume that the gasoline droplets do not interfere with this action by wetting the screen and plugging the holes in the screen, then some type of light progressive loading probably would take place. There is usually a dust filtering ahead of this device, however, to prevent it. [1005]

Q. Now, referring again to Plaintiff's Exhibit 32, the prior art chart, and to the element VII under both the Kaiser and Manning patents, opposite VIII you have "no." Those "noes" indicate that in Kaiser and Manning, in your opinion there is no progressive loading, is that correct?

A. Not necessarily because element VIII contains two features, if I may read it:

"whereby the medium may flow through \* \* \* said members near the entrance of the panel when the filter is clean and partially through said passages and thence through \* \* \* the members located

(Testimony of Sydney F. Duncan.)

progressively toward the exit of the panel as the panel becomes progressively loaded with particles.”

The “no” is there on the basis of the entire amount of element VIII and not just solely on the progressive loading. We missed the mesh members through which the medium may flow in Kaiser and Manning.

The Court: We will have the morning recess.

(Short recess.)

The Court: Proceed.

By Mr. Harris:

Q. Mr. Duncan, we were on the Kaiser and Manning patents referred to on Plaintiff's Exhibit 32, opposite VII on that chart you show “no” as to each of those two [1006] patents.

Now do I understand your testimony to be that Kaiser and Manning do have progressive loading or do they not?

A. By that you mean that it loads first at the front and then at the back, so to speak?

Q. Progressively starting with the front and extending to the back.

The Court: The front being where the air is introduced?

Mr. Harris: Yes, your Honor.

The Court: That condition would probably exist, that the first surface to encounter the dust would collect the first.

The Court: Why do you say “no” here then?

The Witness: Because I am answering “no” to the entire element of VIII which says:

(Testimony of Sydney F. Duncan.)

“whereby the medium may flow through \* \* \* said members near the entrance of the panel when the filter is clean and partially through said passages and thence through \* \* \* the members located progressively toward the exit of the panel as the panel becomes progressively loaded with particles.”

There is no flow through the members in Kaiser and Manning.

The Court: It has progressively loading but there is no flow through the members? [1007]

The Witness: That is correct, your Honor.

By Mr. Harris:

Q. Now referring to the Moller (British) patent, you are familiar with the fact, are you not, that air filters of that general character are currently made and sold in the United States by the Continental Air Filter Company?

A. Yes, something like this.

Q. And those are infringement type filters, are they not?      A. That is right.

The Court: You mean just the Moller patent?

Mr. Harris: The Moller patent we are talking about now.

The Court: You said “those.”

Mr. Harris: I was referring in that case to the filters themselves, your Honor.

Q. Showing you Defendants' Exhibit DD, which I think earlier in your testimony you said correctly illustrates the construction of the Niestle (French) patent except for the mesh of the screen members in this model, is that correct?

(Testimony of Sydney F. Duncan.)

A. I don't believe I have had Exhibit DD in my hands except—well, certainly not on the stand.

Q. Would you examine it now and state whether, so far as the filter media is concerned, it is substantially like the filter media illustrated in the Niestle patent?

A. In the structure of the expanded screen members, [1008] Exhibit DD does conform to the French patent to Niestle.

However, this is made of, it looks to me like, 14 or 16 mesh screen and these holes would not be plugged with the ordinary oils we use now as is taught in the Niestle filter.

Q. And as illustrated by Exhibit DD, there are well-defined passageways formed by the wire mesh members, are there not, in this device?

A. Yes, there are.

Q. And those passageways extend from front to back of the filter panel, do they not?

A. From entering air side to leaving air side; yes.

Q. And those passageways subdivide the panel in both dimensions perpendicular to the flow of air through the panel? A. Yes.

The Court: The mesh there, you could coat that with axle grease and that would fill up all the interstices, would it not?

The Witness: Yes, sir.

The Court: Or asphalt?

The Witness: Yes, sir.

By Mr. Harris:

Q. Now in the Niestle patent each one of those



(Testimony of Sydney F. Duncan.)

passageways that goes from the entrance to the exit side of the panel is connected with adjacent passageways on each side by openings, is it not? [1009]      A. Yes, it is.

Q. And that is the same general type of construction that is present in the Air-Maze P-5 filtering media, is it not?

A. As concerning the passageways?

Q. Yes.

A. There are passageways in the P-5 filter which connect with other passageways.

Q. Laterally?

A. Laterally, and there are passageways in the Niestle filter that connect with other passageways laterally, yes.

Q. And the angle which those passageways in the Niestle patent make with the entrance face of the panel is substantially the same as the angle that the passageways in the '479 Farr patent in suit make with the entrance side of the panel, is that correct?

A. Well, there is an angle which can be varied at the model maker's wish, but there is an angle.

Q. And the angle in the Niestle patent or passageways is substantially similar to the angle shown in the Farr patent in suit?

A. I think the drawings in the Farr patent in suit show a 30 degree angle, where the Exhibit DD show approximately 45 degrees. In that they are similar.

(Testimony of Sydney F. Duncan.)

Q. There is nothing in the Farr patent in suit which [1010] would indicate what the angle should be that the passageways make at their entrance relative to the face of the panel?

A. No, there is nothing in the writing in the patent.

The Court: It has been testified that Exhibit YY here was built on the teachings of the Niestle patent.

The Witness: Yes, it has.

The Court: Well, these passageways as shown through the glass window on one side of this, do they extend that way all the way through, the same angle, the 45 and down sharp 45 and out?

The Witness: If the six sheets of screen were perfectly aligned those passageways would be the same through the entire filter.

The Court: These passageways here between the screens conform to the Z type of passage in the P-5 filter, do they not?

The Witness: Yes, they do. The Niestle patent teaches, however, that one could continue alternating directions of the passage any number of times.

In Fig. 1 of the Niestle patent the passageway is a W, whereas in the Fig. 5 of the Niestle patent the passageway is a Z.

The Court: And this conforms to Fig. 5?

The Witness: This one conform to Fig. 5.

The Court: In Exhibit YY and that little one you have [1011] in your hand there?

(Testimony of Sydney F. Duncan.)

The Witness: Exhibit DD. I don't have it any more.

(The exhibit referred to was passed to the witness.)

The Witness: Exhibit DD is also a Z.

The Court: Substantially the same angle as Exhibit YY?

The Witness: Substantially the same angle as Exhibit YY.

The Court: These passageways alternate?

The Witness: How do you mean, alternate?

The Court: The one nearest the window on Exhibit DD and on Exhibit YY shows a distinct passageway, but the passageway immediately next to that alternates half way between this passageway and the one shown above it on the window.

The Witness: Yes, your Honor. And that accounts for the interconnection between the two passageways which is perhaps more clearly seen on Exhibit DD in that there is a hole formed by the fact that the expanded metal type of structure is used.

The Court: I see on its face that this Exhibit DD is open on two sides, one on the end and one on the end next to the window.

The Witness: That passageway is offset half way.

The Court: It is offset half way with respect to the one next to it.

The Witness: Yes. [1012]

(Testimony of Sydney F. Duncan.)

The Court: And the next one to the left of that one corresponds to the one on the extreme right.

The Witness: That will be true. Every other passageway will be in line.

The Court: And that would be true likewise of this Exhibit YY?

The Witness: Yes, your Honor, and of Exhibit LL, which is the dirty one.

By Mr. Harris:

Q. Mr. Duncan, relative to this Niestle patent, there has been some mention made of welding in these models. Don't you note some black dots on the drawings of the patent which indicate solder or welding at the connections of the screens?

A. (Examining exhibit) I don't think the patent teaches anything about those black dots.

Q. Isn't that the way you interpret it, as being soldered connections?

The Court: What black dots?

The Witness: The dots he is referring to, your Honor, are on Fig. 5 at the point where the first section of the passage shown as a cross-section line, the middle of that cross-sectioned strip of screen, so to speak, there is a black dot which shows a little better in some photostats than others.

The Court: It looks to me as though some fellow was [1013] using it as a place to draw a line.

The Witness: These are the black dots referred to, and in my estimation that is a draftsman's happenstance because he had to draw lines at two different angles at that particular point and his ink ran a little bit.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Referring again to this prior art chart, Exhibit 32, and to the page entitled "Claim 7," under the column "Niestle (French)" and III, you say "no." That is, you mean that the Niestle patent does not disclose mesh screening members, is that correct?

A. In the sense that I have testified in each case with respect to this particular element, that when the Niestle patent is built according to the disclosures of the patent, whatever media is used presents a solid coated surface without the opportunity of air flow through the material of the member.

Q. Now IV, under the Niestle patent, you also have "no" and that element, IV, reads, "passages of relatively large size as compared with the openings in said \* \* \* members." That I assume is predicated upon——

The Court: Just a moment. IV? I do not see it.

Mr. Leonard S. Lyon: Claim 7.

Mr. Harris: Claim 7.

The Court: I beg your pardon. [1014]

By Mr. Harris:

Q. That I assume is predicated on your answer to the last question, that in Niestle the members do not have any openings through them when they are coated, is that correct?

A. That is right.

Q. And that is the only difference?

A. That is the only difference.

(Testimony of Sydney F. Duncan.)

Mr. Harris: That is all.

Mr. Leonard S. Lyon: That is all.

The Court: Step down.

(Witness excused.)

Mr. Leonard S. Lyon: The plaintiff rests, your Honor.

Mr. Harris: The defendant rests. [1015]

\* \* \* \* \*

The Court: Are you ready to proceed with the arguments?

\* \* \* \* \*

Mr. Harris: First, if the Court please, in the press of the trial we neglected to offer in evidence the deposition of Richard Spencer Farr taken August 29, 1950, which was on file with the clerk, and I, at this time, offer that deposition and attached exhibits in evidence in this case.

The Court: That was taken under Rule 45 (b)?

Mr. Harris: Under 43 (b).

The Court: 43 (b) or whatever it is.

Mr. Harris: Yes. Pursuant to the Rules of Civil procedure. [1020]

\* \* \* \* \*

Mr. Leonard S. Lyon: I haven't any objection to it, your Honor.

The Court: But, usually, when the witness is present whose deposition has been taken, only those portions of the deposition used for impeachment purposes are admissible. However, if there is no objection, it may be admitted and marked in evi-

dence as the defendants' next exhibit in order, which would be AAA.

The Clerk: AAA.

Mr. Harris: AAA.

(The deposition referred to was marked as Defendants' Exhibit AAA and received in evidence.) [1021]

[Printer's Note: Defendants' Exhibit AAA is reproduced in Book of Exhibits.]

\* \* \* \* \*

The Court: Just a moment, on that one point. I hope you do not mind if I interrupt by asking Mr. Lyon a question.

Mr. Harris: No, your Honor. I welcome your interruptions.

The Court: On your chart that you have presented to me, which I think is Exhibit No. 32, it seems to me that you have indicated that each one of the eight elements that you claim in the patent in suit has been separately disclosed in some one or other of the prior-art patents.

Mr. Leonard S. Lyon: I think that is true, your Honor.

The Court: Then, you maintain that this is a combination patent and not a mere aggregation of old elements?

Mr. Leonard S. Lyon: That is our position.

\* \* \* \* \* [1058]

The Court: There is no evidence in the case that the Orem device was ever made and sold

commercially or that it worked successfully.

Mr. Harris: No, there is no evidence of that, your Honor. I concede that.

The Court: And the evidence in the case here would warrant the inference that the air filter made by the plaintiff was a commercial success, therefore it failed a need which had not been filled by devices theretofore on the market.

Mr. Harris: I think they have done very well with it. Yes, I concede that. [1080]

\* \* \* \* \*

The Court: This application is signed and sworn to April 1, 1940.

Mr. Harris: You are referring now, if your Honor please, to the application for the patent in suit?

The Court: Yes. I am referring to the application which is the original document in the file wrapper of the patent in suit.

Mr. Harris: Then, if the Court please, that is at page 11 of the file wrapper, which I believe you are referring to, your Honor.

The Court: Yes.

Mr. Harris: That is the point. That is not the signature of the application. The application has to be separately [1087] signed.

Mr. Leonard S. Lyon: It is also signed on the first page, your Honor, page 4 of the document.

The Court: Where it says "Petition and Power of Attorney."



Mr. Leonard S. Lyon: It says that "patent may be granted to him for the Air Filter Panel set forth in the annexed specification," with the inventor's name, Morrill N. Farr.

The only place that counsel is talking about is on page 12.

The Court: Yes. Do you claim he signed it?

Mr. Leonard S. Lyon: He signed it twice, but he did not sign it three times.

The Court: He signed it and he verified it?

Mr. Leonard S. Lyon: That is right.

The Court: In other words, does the law say the application for patent has to be signed at the end?

Mr. Leonard S. Lyon: No.

Mr. Harris: This is Section 33, Title 35 of the statute, which says, "The specification and claim shall be signed by the inventor."

It does not say where they shall be signed, but it says they shall be signed by the inventor.

The Court: Well, counsel, it seems that the petition in the beginning here refers to them as annexed, that being signed. [1088] It is signed by the inventor. Otherwise, is he going to have to sign every page, every line and every word?

Mr. Harris: No. He signs at the end, as a general thing, that is all. He signs the second specification. The Patent Office said he had to sign it, your Honor. The Patent Office said here he had not signed, and that he must file a signed application before the patent issues.

The Court: Where does it say that?

Mr. Harris: Well, all right, we will find that. I think it is in the very last action taken by the Patent Office. Yes, at page 87 of the file wrapper:

“Attention is again directed to the fact that the specification is unsigned. A properly signed permanent copy of the specification as originally filed is required.”

They had required that on the first action that they took. They said it wasn't properly signed.

At page 13 they said:

“This application is informal in that the specification is unsigned. A new specification properly signed is required.”

So the defendant is saying that there was not any specification or claim before the Patent Office before February, 1942, which was more than two years.

The Court: Does the Patent Office have any rule or regulation which says it shall be signed at the end? [1089]

Mr. Harris: I will have to read the rule to your Honor.

The Court: Of the specifications?

Mr. Leonard S. Lyon: The present rule?

Mr. Harris: Yes.

Mr. Leonard S. Lyon: The present rule only requires one signature to the whole thing.

Mr. Harris: That is right. We would have to go back, and get the rule as of that time.

The Court: In 1939?

Mr. Harris: That is right.

Mr. Lyon: The present rule, your Honor, that is an entirely ministerial rule of the Patent Office. The statutory rule has not been changed, and the present ministerial rule of the Patent Office, instead of requiring three signatures on the papers, requires one signature, that is all. And here there were two, and the Patent Office wanted a third one, which has nothing to do with the statute at all.

Mr. Harris: I don't know that there is any evidence in this case that that first asserted signature is the signature of Morrill Farr. There is no affidavit that it is. It does not say it is his signature.

Mr. Leonard S. Lyon: You can compare it.

The Court: It says, "Inventor signs full name:".

Mr. Harris: It just says "Inventor's name."

The Court: And in this matter I think we can indulge in [1090] the presumption that the law has been obeyed, can't we?

Mr. Harris: The Patent Office says not. At any rate, that is our point on that. I don't want to belabor it, but I think it is a defense.

The Court: I don't think it is good. I think the application for patent was signed and dates back to the original application, the original one that was filed and rejected, and if that is not true, in any event it dates back to this one filed by Lyon & Lyon. [1091]

\* \* \* \* \*

The Court: Now does not the P-5 effect a multiple subdivision of the panel in both directions,

not all the way through but at least partially and alternately?

Mr. Harris: I don't think if your Honor please, that [1106] just these isolated contact points throughout the depth of the P-5 filter——

The Court: But you have an opening and it goes in a little ways, do you not?

Mr. Harris: Yes. Then it can spread out any way it wants to.

The Court: Then there is another opening that goes another leg of the Z, and another one.

Mr. Harris: It goes in all different directions.

The Court: So is that not a multiple subdivision of the panel?

Mr. Harris: No, I don't think it is a subdivision at all; it is just points spotted through the panel.

The Court: But they are multiple subdivisions.

Mr. Harris: Your Honor, I wouldn't say.

The Court: But you have paths where the air flows, do you not, in addition to flowing through the mesh?

Mr. Harris: I have a very large number of different paths that the air may take, and probably does take.

The Court: Are they not subdivisions of the panel in both directions?

Mr. Harris: No, I don't think so.

The Court: In other words, instead of being one continuous, although changing direction, as you assert the Farr to be, yours has a number of passages which are changed. You [1107] point out

that air can go in one and come out in five or six others, whatever it is.

Mr. Harris: Yes, sir.

The Court: Those are exits, are they not, these channels?

Mr. Harris: Yes.

The Court: They are passages.

Mr. Harris: They are paths through which the air may flow in going through the screen.

The Court: Are they not multiply subdivided?

Mr. Harris: No, I can't visualize those as subdividing that panel in any respect.

The Court: How does your panel get subdivided?

Mr. Harris: I don't think it is subdivided. I think it merely has different paths through which the air may flow through a multiplicity of it from any starting point.

The Court: That is what they say they claim here, multiple subdivisions.

Mr. Harris: Well, it doesn't subdivide it in the vertical dimension.

The Court: It subdivides it in the vertical dimension by virtue of the crimps.

Mr. Harris: No, because in the crimps, if your Honor please——

The Court: I think the vertical crimp rather than your [1108] Z. In other words, you have a crimp vertically in a Z shape.

Mr. Harris: I don't know that we have a crimp vertically.

The Court: They are not at right angles, but they are crimped vertically generally according to the——

Mr. Harris: The sheets of material lie in a horizontal plane.

The Court: Yes, and the crimps are up and down.

Mr. Harris: The crimps are up and down.

The Court: Let us call that vertical.

Mr. Harris: Yes.

The Court: And then they run zigzag in a Z shape, do they not?

Mr. Harris: Yes, they do.

The Court: And each one of those forms a passage?

Mr. Harris: No, it does not, your Honor.

The Court: It forms multiple passages?

Mr. Harris: No, your Honor. Those corrugations are oppositely disposed and it is only where the corrugations, the crests of the corrugations, cross that there is any contact point. That is shown by Exhibit——

The Court: Yes, I remember that. But the air can go in one of these channels and come out that same channel, can it not?

Mr. Harris: I don't see how it could.

The Court: Where is your plastic exhibit with the strings?

Mr. Harris: Exhibit SS shows various paths through which the air may travel starting in at one entrance opening on the entrance side of the panel.

Exhibit I, which has the green and red lines on it, illustrates that it is only where those green and red lines cross that there is any contact between adjacent layers. It is only where the green and red lines cross that you have any contact. Those are merely points, contact points.

The Court: Let us take this little pathway here on this Exhibit I——

The Clerk: That is not our exhibit number, your Honor.

The Court: Is this not in evidence?

The Clerk: That was on the pretrial.

Here you are.

(The exhibit referred to was passed to the Court.)

The Court: Exhibit 6.

Any one of these little corrugations here, the air can come in one side and go out that same one without leaving that corrugation, can it not?

Mr. Harris: I suppose it could. There is no evidence that it would or that it would even be likely to. I don't think it would.

The Court: How about your strings? Your strings show [1110] that it would and does, and also your diagrams.

Mr. Harris: The strings show that it can go through any one of a number of paths.

The Court: But it can also go out the same one that it enters.

Mr. Harris: Yes, I think that is true.

The Court: Whether it is the upper one, which does not lie—well, I do not know how you would say it—crosswise or something to the other one.

Mr. Harris: I think that is true, that it could do it that way.

The Court: So that it can go out. Well, then, is not that a multiple subdivision in both dimensions?

Mr. Harris: No, it isn't subdividing it in the vertical plane, your Honor, because every time one of those corrugations goes over another there is a space, there is an opening around it. In other words, they are open through laterally. It doesn't subdivide it.

The Court: Is not this crimp a subdivision?

Mr. Harris: I don't think it is when you assemble the filter. No, I do not think so.

The Court: When you have your crimp there, that forms a pathway. Suppose the air came along here, it can flow right out that same one, can it not?

Mr. Harris: It is just as though we cut a ditch in the [1111] floor of this courtroom, and it was open on top and we put a zigzag in it and tried to blow air through it. It wouldn't stay in the ditch, it would come out the side.

The Court: Some of it might stay in the ditch.

Mr. Harris: Some of it might stay in the ditch, that is true, but most of it would come out the sides.



The Court: Does not most of the air going through any of these filters go through the screens?

Mr. Harris: Yes, it does, it goes through the screens, I agree with that, when the filter is clean.

The Court: When the filter is clean, and when it begins to clog up it goes further until it goes through the screen, but some of it goes out the same hole that it went in. [1112]

Mr. Harris: Well, I don't know.

The Court: Doesn't it?

Mr. Harris: I don't know whether it does or not, frankly. I don't think we have any testimony on that.

The Court: Well, that is what the testimony said. [1113]

\* \* \* \* \*

## ARGUMENT ON BEHALF OF THE PLAINTIFF

Mr. Leonard S. Lyon: May the Court please, at the outset of this case I stated that the filter of the panel of the patent in suit had a novel construction and that the essential elements of that construction consisted, first, of a plurality of sheets of crimped wire screen arranged parallel to the direction of airflow and forming passages through the filter.

Second, that the sheets divided the panel in two dimensions into a plurality of subdivisions.

And, third, that a portion of each of the passages was disposed angularly so as to provide a change

of direction of [1130] the flow of the air through the passages.

I stated that those were the essential characteristics of this patented filter. Mr. Duncan's testimony was to the same effect.

I next stated that this construction provided a unique operating characteristic, and by "unique" I mean an operating characteristic which had never been known or ever been had by any filter in the art before.

This operating characteristic is set forth at page 1 of the patent in suit, column 1, lines 32 to 38, and I think I might just take a moment to restate that. [1131]

\* \* \* \* \*

Now the patent has a mode of operation which could only be had of this combination formed with wire screen where the operation permits this mode of operation. The new mode of operation of this combination is described in the patent at page 2, column 1, lines 15 to 36, in which it describes this fact, that in the initial operation the air tends to go through the screens where the dust collects by impingement. As those screens become filled the pores in those screens become filled, there is a progressive action down the filter and it is that mode of operation that Mr. Duncan says is responsible for these new characteristics. [1133]

\* \* \* \* \*

The first one of these that I would like to talk about is the attempt to rely on a device which they

say corresponds to the paper filters but which is made out of wire screen. Your Honor asked a pertinent question. Counsel hasn't made much of the point in his argument, but I think it should be answered. Your Honor asked the question, do I contend that it amounted to invention to make the Detroit paper filter out of wire screen, and I said in reply to that that I certainly did, that if the exhibit which the defendant had produced here which showed that change existed in the prior art, then we wouldn't have a case. [1134]

\* \* \* \* \*

The Court: In your paper filter, was that not old in the art to use screens for filters?

Mr. Leonard S. Lyon: Yes.

The Court: Does it require invention to substitute something that is already known to be useful for a particular purpose?

Mr. Leonard S. Lyon: Depending on what the effect of that substitution is. [1136]

\* \* \* \* \*

Now counsel has referred to the Schriber-Roth case and the fact that there was a Claims 4 and 6 in the original abandoned application. He says that because of those claims which were cancelled that the broad claims of this patent cannot cover the device of those narrow claims, and he cites the Schriber-Roth case to that effect and he talks about estoppel. [1150]

\* \* \* \* \*

The Court: Claims 6 and 4 are narrower in their

statement than your Claims 4, 7 and 8, are they not?

Mr. Leonard S. Lyon: That is correct. And he is trying to say that there is a file wrapper estoppel on the issue of infringement, and he cites the Schriber-Roth case. The Schriber-Roth case isn't a case on file wrapper estoppel on infringement at all, it is a totally different kind of a case. It has nothing to do with the file wrapper estoppel on infringement. The Schriber-Roth case was a case where a man tried to sustain the validity, not infringement, the validity of a claim he got in his patent which didn't mention a feature [1151] which he found he had to have in his claim to avoid the prior art. And he says, I want the Court to read that element into my claim and save my claim, and the Court says, but you had a claim in your patent that had that element in it and you cancelled it out, for some reason, when it was rejected, and now having cancelled the claim for that element you can't expect the Court to read that cancelled claim into your allowed claim to save the claim. There wasn't any question of the scope of the claim at all. [1152]

\* \* \* \* \*

The Court: Well, it seems to me that this Snow case would be conclusive on the subject, that while the specifications and the drawings may be used to explain a claim, if a particular method of construction is claimed as the best, as stated by that claim, unless the claim of the patent specifically

incorporates it, it would seem to me that the patent is not to be so limited. [1160]

\* \* \* \* \*

The Court: That Claim 4 of your original application of the patent in suit and Claim 6 of the abandoned application are both narrower than 4, 5, 7 and 8, in that each of them disclosed the laying of the crimped screens so that the angles would touch and they would not mesh.

Mr. Leonard S. Lyon: That is right. [1162]

\* \* \* \* \*

The Court: On the point that you were making in connection with the Niestle patent, I am afraid I cannot agree with Mr. Harris that that is merely an alternative of having the gauze filled with oil so as to form a continuous thick film, because on the second page of the patent, the first paragraph, he states that according to one embodiment the elements are superimposed so as to form zigzag conduits in which the gas to be purified circulates. In other words, he keeps talking of the conduits there.

And then in the next paragraph he states that according to another embodiment the elements are arranged on each other in such a way that the lips of the slots of the two adjacent elements are interconnected, thus forming conduits of [1169] considerable length. The gas is thus compelled to follow a path between sharply staggered points and these marked changes in the direction favor the deposition of dust.

So it would seem to me that his use of the gauze there was not to partially force the air through it, or the gas as he calls it, but merely to have a little metal which could be coated easily with oil and perhaps hold it better than a smooth surface, to form these paths or conduits. [1170]

\* \* \* \* \*

Mr. Leonard S. Lyon: The three prior patents that were mentioned just before the recess, the St. Cyr, the Preble and the Kirkham patents, are the three patents on the defendants' chart which are asserted on that chart to show all of the elements of the claims in suit, the combination of the claims in suit. I want it understood that I don't feel——

The Court: I do not think that Preble does. I would not waste any time on that. [1178]

\* \* \* \* \*

Now I can go through Preble if your Honor thinks it is necessary.

The Court: No, I don't think so. I would not waste any time on it because I do not think it anticipates the combination here. It teaches that there should be these straight screens, both inlet and outlet side. [1179]

\* \* \* \* \*

The Court: Counsel, I am satisfied that none of these patents which were for washers of air, that is to say, that washed the air with water, anticipated the patent in suit. [1182]

\* \* \* \* \*

## MEMORANDUM OPINION

The Court: The first thing to determine is the validity of the patent in suit, that is, '479. I have listened with a great deal of interest to the presentation of the evidence and the argument, which has certainly been most excellently done by both counsel.

I do not agree with the defendant's contention that the claims of the plaintiff's patent were anticipated entirely by any previous patent. As I indicated a while ago as to the Niestle patent, it seems to me that it would require, even though the material might be a mesh, that an essential element of that was that there would be a sufficient oil on it to make it a solid wall so that the air would not circulate through the foramans of the screen.

As to the other patents here that involved washing, it seems to me that it is an entirely different use, a different object, and this is not merely the conversion of something which was disclosed in the prior art to a different use such as existed, in my judgment, in the case I tried just before this one involving the automobile feelers.

In all of the cases involving water the air is washed and they do not operate upon the impingement theory. They might impinge for a moment, but they are immediately washed off. So I do not think any of those anticipate completely the elements of the claims of any of the four claims in suit [1198] here.

Nor do I think the St. Cyr does. It has probably given me more trouble in consideration than any

of the others. There are a number of differences in it. I think the most striking one is the fact that while these indentations or valleys or ridges, or however you might describe them, do call for a change of direction of the fluid passing through there, nevertheless one of the big points made in the patent in suit and in the file wrapper and in the argument in obtaining the patent was the abrupt change of direction in these passages which caused turbulence in the air and forced it to pass out and spread over and through the filtering material.

Moreover, again it is required to be encased and is, in a sense, a washer too because it is for the use of a gaseous fuel mixture. I do not see how it could be adapted and perform the same function as the plaintiff's patent in suit here.

Consequently I hold that none of the prior art anticipated all of the claims of the plaintiff's patent. As the plaintiff has stated here, all of the elements which are disclosed in the plaintiff's claims in the patent in suit are old. Each one of them has existed before or been used in some one or another previous device or, as I say, disclosed in a previous patent.

So the question is whether or not there is a sufficient [1199] novelty in the invention or in the combination which the plaintiff has put together here to constitute invention or to be merely an aggregation of ideas or aggregation of previous disclosures.

I am inclined to think that the evidence preponderated very heavily in favor of the plaintiff's



contention that this is not a mere aggregation of elements and that it is a combination which produced a new and useful result, and when I say "new and useful result" I do not just mean cleaning air but all of the things that must be taken into consideration in the manufacture and sale and use and cost and maintenance and upkeep of air filters. And while I recognize the rule to be that commercial success alone is not sufficient to indicate that a thing is new or useful, that is, to the extent that it is invention, nevertheless it is an element which can be taken into consideration in the light of all of the other evidence, and the commercial success of this venture is one of the things which indicates strongly to me, in addition to the other evidence, that it is invention.

Another thing that strikes me in that connection was the very exhaustive and painstaking study made by Professor Rowley for the Association of American Railroads, and his report—I do not recall the evidence as to when it was completed—but the report of the railroads bears the date of 1938, and as I recall I believe he said he conducted [1200] the experiments within the previous year. As a result of that study no suggestion was made for the substitution of wire gauze, for instance, for paper, such as is disclosed in the paper filter on file here—I have forgotten the name or the number of the patent. I believe that was the Kaiser patent?

Mr. Leonard S. Lyon: Yes, your Honor.

The Court: Moreover, the mere fact of that ex-

haustive study made by Professor Rowley would indicate that the industry interested in the matter of air conditioning or air cleaning or air filters was going to great pains and great lengths and spending a great deal of money and doing it scientifically in order to find what apparently the plaintiff put together here in a combination, a successful and novel and useful invention.

I accordingly conclude that the plaintiff's patent is valid in so far as that is concerned.

The matter of the file wrapper estoppel was urged by the defendant only in so far as infringement is concerned, so I come now to the question of infringement.

I think that the defendant's device does infringe. By that I do not mean to say nor to imply that there is no invention in the defendant's device. It might be that the defendant's device is invention in so far as laying the material so that the angles touch each other, or it may be that the addition of another zag or zigzag on the end of [1201] the Z might be invention. But essentially it seems to me, after studying the devices and seeing them here and hearing all of the expert testimony, that they are essentially and basically the same idea. The idea of using the impingement method, the idea of introducing the air along the plane of the filtering material, the idea of having them broken up into zigzags to form the passages and so as to create the turbulence of the air, and its general method of construction and use, seems to me are embodied in the defendant's device so that basically it does infringe.

On the matter of file wrapper estoppel, it does not seem to me that the Supreme Court has reversed the statement made in the Snow case. But in view of my holding I do not think it is necessary to pass on the question as to whether or not there is or is not any file wrapper estoppel because in view of my holding it might be that the defendant's device, that element in their device where the layers are laid upside down against one another so that their angle fits, that might be invention, but basically it still infringes. If it is necessary for me to decide whether or not there is or is not file wrapper estoppel, I will adopt the doctrine of the Snow case and hold that there is not.

And that seems to me to be very logical because the Patent Office has issued the broader claims and it might well be that a person seeking a patent such as the patentee in [1202] this case would concur in the abandonment of a narrow claim in the effort to get and to secure a broader claim where, for instance, under the terms of Claim 4 or 5 or 7 or 8 it seems to me that the layers can be laid either way. These claims in suit do not involve the placing between the layers of the flat screen material. The claims do claim a multiple subdivision of the panel in both dimensions perpendicular to the general direction of the flow of the medium to be filtered, thereby forming passages extending through said filter, the walls of which passages are composed of such mesh members.

If the screen material is taken out and the mesh members are laid together without having their

angles on one another they would either fall in place so that there would be no passages whereby the screen material would form the walls or it would be extremely difficult to so construct it so that by jarring they would not fall together and mesh. The essential thing is that they shall form passages. So would it not be logical for one who is constructing a device under these claims in suit, in order to be sure that the passages are formed, would place them in the position that I call upside down to one another, that is to say, so that the angles of the ridges here would touch one another rather than to fold into one another.

In any event, I do not think there is file wrapper estoppel. I do not think there is anything else for me to pass [1203] on at this time.

I take it that in so far as the matter of any damages for infringement are concerned, that after you gentlemen get through your route in the Circuit Court of Appeals and elsewhere, and if I am affirmed, you will be back here for that purpose. For that reason I will put the matter of damages off calendar to be reset on notice. And counsel will prepare findings of fact and conclusions of law.

Is there any point that I should have touched upon here that I have not or on which counsel would like to have me express myself?

Mr. Leonard S. Lyon: I think not, your Honor.

Mr. Harris: No, your Honor.

The Court: Very well. Court is adjourned.

\* \* \* \* \*

[Endorsed]: Filed March 20, 1952. [1204]

[Endorsed]: No. 13,352. United States Court of Appeals for the Ninth Circuit. Jules D. Gratiot and Air-Maze Corporation, Appellants, vs. Farr Company, Appellee. Transcript of Record. Appeal from the United States District Court for the Southern District of California, Central Division.

Filed: April 22, 1952.

/s/ PAUL P. O'BRIEN,  
Clerk of the United States Court of Appeals for  
the Ninth Circuit.

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In the United States Court of Appeals  
for the Ninth Circuit

No. 13,352

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,

Appellants,

vs.

FARR COMPANY, a corporation,

Appellee.

APPELLANTS' STATEMENT OF POINTS  
ON APPEAL

Pursuant to Rule 19 of this Court, the following is appellants' statement of points on appeal upon which appellants intend to rely:

## 1.

The District Court erred in finding that appellant Air-Maze Corporation is, or has been, doing business within the Southern District of California, Central Division.

## 2.

In Finding of Fact 5, the District Court erred in finding that none of such prior art filters have the mode of operation or achieve the advantages of the Farr patent in suit.

## 3.

The District Court erred in finding that the air filter panels of the Farr patent in suit combined the ability to provide a high efficiency in removing dust from air with a lower pressure drop than previous commercially built filters, and erred in finding that such pressure drop did not increase as rapidly as previously built commercial filters as the filter became loaded with dust, and erred in finding that the air filter panel of the Farr patent in suit provided a further, or any, advantage of low cost of manufacture and low maintenance, as well as ease of cleaning.

## 4.

The District Court erred in finding that the air filter panels of the Farr patent in suit have gone into commercial use at a rapidly increasing rate, and erred in finding that the patent in suit has had a wide, or any, commercial success, and erred in finding that it was responsible for the development of the business of appellee, Farr Company.

## 5.

The District Court erred in finding that the air filter panel described and covered by claims 4, 5, 7, and 8, or any of them, of the Farr patent in suit is not disclosed in any of the prior art or prior uses pleaded and introduced in evidence by appellants.

## 6.

The District Court erred in finding that the Farr patent in suit does not disclose an aggregation, and erred in finding that it does disclose a new combination of elements which cooperate together to provide any advantage in the cleaning of the air or any benefits in cost of manufacture, maintenance, or upkeep.

## 7.

The District Court erred in finding that the devices shown in the prior art patents to Wood, No. 2,252,242; British patent to Kirkham, No. 24,467; British patent to Row, No. 13,222; and British patent to Moller, No. 211,756, or any of them, are not filter panels operating on the principle of impingement of particles on collecting surfaces, and erred in finding that such devices do not remove dust by the same mode of operation referred to in Finding of Fact 4, and erred in finding that such devices do not achieve the alleged advantages of the Farr patent in suit.

## 8.

The District Court erred in finding that devices shown in the prior art patents to Slauson, No. 1,729,135; Kaiser, No. 2,019,186; Manning, No.

2,079,297; Wood, No. 2,252,242; Moller, British 211,756; and Niestle, French, No. 739,956, or any of them, do not possess the mode of operation referred to in Finding of Fact 4, and erred in finding that none of such devices achieve the alleged advantages of the Farr patent in suit, and erred in finding, if in fact it did so find, that the French patent, No. 739,956, to Niestle, employs solid sheets of material which, when oiled or in use, present a solid wall.

## 9.

The District Court erred in finding that patent No. 1,118,237 to St. Cyr does not constitute an air filter panel which operates by the impingement of particles on collecting surfaces, and erred in finding that in the device of the St. Cyr patent the crimps changed direction only slowly and do not provide passages which change abruptly in direction as in the Farr patent in suit, and erred in finding that the device of the St. Cyr patent is not adapted to perform by the same mode of operation referred to in Finding of Fact 4, or otherwise, or achieve the alleged advantages of the device of the Farr patent in suit.

## 10.

The District Court erred in finding that the device of the French patent No. 739,956 to Niestle is a filter made of expanded sheets set at right angles to the intended flow of air, rather than parallel as in the Farr patent in suit, and erred in finding that, when made of metal gauze and oiled, the expanded sheets would present a solid wall, and erred



in finding taht the French patent to Niestle does not operate by the same mode referred to in Finding of Fact 4 or achieve the advantages of the Farr patent in suit.

## 11.

The District Court erred in finding that, for many, or any, years prior to the alleged invention of the Farr patent in suit, the art was familiar with air filters as identified in Finding of Fact 14, and erred in finding that the art expended great or any effort or money in any scientific study or testing of any air filter panels, and erred in finding that the air filter panel of the Farr patent in suit was not suggested thereby.

## 12.

The District Court erred in finding that the Farr patent in suit had marked, or any, commercial success, and erred in finding that the prior art failed to produce an air filter having the mode of operation or achieving the advantages of the Farr patent in suit, and erred in finding that any failure of the prior art is an important, or any, factor to support the conclusion that the combination of claims 4, 5, 7, or 8 of the Farr patent in suit represents an invention and not mere mechanical skill, and erred in finding, if it did so find, that the Farr patent in suit represents an invention and not mere mechanical skill.

## 13.

The District Court erred in finding that appellant Air-Maze Corporation was, or at any time has been, doing business within the Southern District of California.

## 14.

The District Court erred in finding that the P-5 air filter panels manufactured by appellant Air-Maze Corporation and sold by appellant Gratiot are essentially or basically the same as the air filter panels of the Farr patent in suit.

## 15.

The District Court erred in finding that the said P-5 air filter panel breaks the air up into passages having abrupt angles creating turbulence in the air to force the air through the mesh of the screen.

## 16.

The District Court erred in finding that claims 4, 5, 7, and 8 of the Farr patent in suit are not limited to the use of flat screen wire between corrugated or crimped screen wire, and erred in finding that such claims were not intended by the Patent Office or by the patentee, Farr, to be so limited.

## 17.

The District Court erred in finding that claims 4, 5, 7, and 8 of the Farr patent in suit are not limited to the use of crimped wire screen, all of which had the angles of the crimp extending in the same direction, and erred in finding that such claims were not intended by the Patent Office or the patentee, Farr, to be so limited.

## 18.

The District Court erred in finding that the filing of application Serial No. 327,833 did not abandon any of the forms of air filter shown in application

Serial No. 285,904, and erred in finding that the file wrappers of said applications do not contain any abandonment or estoppel such as would prevent claims 4, 5, 7, and 8 of the Farr patent in suit from including the said P-5 air filter panels.

19.

The District Court erred in concluding that Letters Patent No. 2,286,479 was duly and legally issued.

20.

The District Court erred in concluding that claims 4, 5, 7, and 8, or any of them, of the patent in suit are good or valid in law or cover a new or meritorious invention.

21.

The District Court erred in concluding that appellants, or either of them, have infringed any of the claims of Letters Patent No. 2,286,479 in suit.

22.

The District Court erred in concluding that appellant Air-Maze Corporation, for venue purposes or otherwise, is a resident of the Southern District of California, Central Division.

23.

The District Court erred in concluding that appellee is entitled to any judgment as prayed for in the complaint.

24.

The District Court erred in failing to find and conclude that Letters Patent No. 2,286,479 in suit,

and each of the claims thereof, is void and invalid in law.

## 25.

The District Court erred in failing to find and conclude that none of the claims of Letters Patent No. 2,286,479 in suit had been infringed by the appellants, or either of them.

## 26.

The District Court erred in ordering a perpetual injunction to issue, as provided for in Paragraph (4) of the judgment, or otherwise.

## 27.

The District Court erred in ordering that appellee recover general damages, costs, or interest from appellants, as provided for in Paragraph (5) of the judgment, or otherwise.

## 28.

The District Court erred in failing to hold that it had no jurisdiction over the person of the appellant Air-Maze Corporation and that as to it venue was improperly founded, and erred in failing to dismiss the complaint in this action as against Air-Maze Corporation upon such grounds.

## 29.

The District Court erred in its order filed and dated July 13, 1950, denying the motion of appellant Air-Maze Corporation to dismiss the action and to quash the service of process.

## 30.

The District Court erred in failing to hold that since appellant Air-Maze Corporation had committed no acts of infringement in this District and did not have a "regular and established place of business" in this District, such Court had no jurisdiction of appellant Air-Maze Corporation, and that as to said appellant, venue was improperly founded, and erred in failing to dismiss the complaint in this action and quash service of process as against appellant Air-Maze Corporation upon such grounds.

## 31.

The District Court erred in failing to find that air filters of the types disclosed in the patents to Farr, No. 2,286,480 and No. 2,286,479 were in public use and on sale and were known and used in this country more than one year prior to the effective date of the filing of the application for the Farr patent, No. 2,286,479, in suit, and erred in failing to find that such air filters embodied every element of every claim of said patent in suit in which they operated in substantially the same way to produce substantially the same result as in the patent in suit, and erred in failing to find and hold that the patent in suit is invalid and void by reason thereof.

## 32.

The District Court erred in failing to find that air filters of the type disclosed in the patent to Farr, No. 2,286,480, were in public use and on sale and were known and used in this country by others

The following exhibits, to be reproduced in a Book of Exhibits:

Plaintiffs' Exhibits: 1, 1-A, 1-B, 4, 11, 13, 17, 26, 27, 29, 30, 31, 32.

Defendants' Exhibits B, J, Z, AA, HH, MM, NN, OO, VV, XX, ZZ, AAA.

It is hereby further stipulated, subject to the approval of the Court, that the following exhibits need not be printed, but may be considered by the Court in their original form without the necessity of reproduction:

Plaintiffs' Exhibits 2, 3, 5, 6, 7, 8; 9a to 9j, inclusive; 12; 14a to 14g, inclusive; 15(a) to 15(c), inclusive; 16, 18, 22, 23, 28.

Defendants' Exhibits A, C, D, E, F, G, H, I, K, L, M, N, O, Q, U, V, W, X, Y, BB, CC, DD, EE, FF, GG, II, JJ, KK, LL, PP, QQ, RR, SS, TT, UU, WW, YY.

Dated: At Los Angeles California, this 22nd day of May, 1952.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN & DORAN  
GEORGE S. BALDWIN

HARRIS, KIECH, FOSTER & HARRIS  
FORD HARRIS, JR.

DONALD C. RUSSELL

/s/ By FORD HARRIS, JR.

Attorneys for Appellants

LYON & LYON

/s/ By RICHARD F. LYON

Attorneys for Appellee

[Endorsed]: Filed May 23, 1952. Paul P. O'Brien

[Title of U. S. Court of Appeals and Cause.]

## STIPULATION RE PRINTING OF RECORD

It Is Hereby Stipulated by and between the parties to the above-entitled action through their respective attorneys, that as to Defendants' Exhibit NN, heretofore designated in its entirety for printing in the printed record on appeal by the "Stipulated Designation of Portions of Record to be Printed and Considered," dated May 22, 1952, only pages 1, 8, and 9 of said Defendants' Exhibit NN shall be printed, or otherwise reproduced, and included in the Book of Exhibits, and that the balance of said Defendants' Exhibit NN shall not be printed but may be considered by the Court in its original form without the necessity of reproduction.

Dated: At Los Angeles, California, this 1st day of August, 1952.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN & DORAN  
GEORGE S. BALDWIN

HARRIS, KIECH, FOSTER & HARRIS  
FORD HARRIS, JR.

DONALD C. RUSSELL

/s/ By FORD HARRIS, JR.

Attorneys for Appellants

LYON & LYON

/s/ By RICHARD F. LYON

Attorneys for Appellee





No. 13352

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**United States  
Court of Appeals**  
for the Ninth Circuit.

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**JULES D. GRATIOT and AIR-MAZE  
CORPORATION,**

**Appellants,**

**vs.**

**FARR COMPANY, a Corporation,**

**Appellee.**

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**Supplemental  
Transcript of Record  
Volume IV  
(Pages 1161 to 1169)**

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**Appeal from the United States District Court for the  
Southern District of California  
Central Division.**

**FILED**

**MAY 18 1953**

**PAUL P. O'BRIEN**

**CLERK**



No. 13352

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**United States  
Court of Appeals**  
for the Ninth Circuit.

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**JULES D. GRATIOT and AIR-MAZE  
CORPORATION,**

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**vs.**

**FARR COMPANY, a Corporation,**

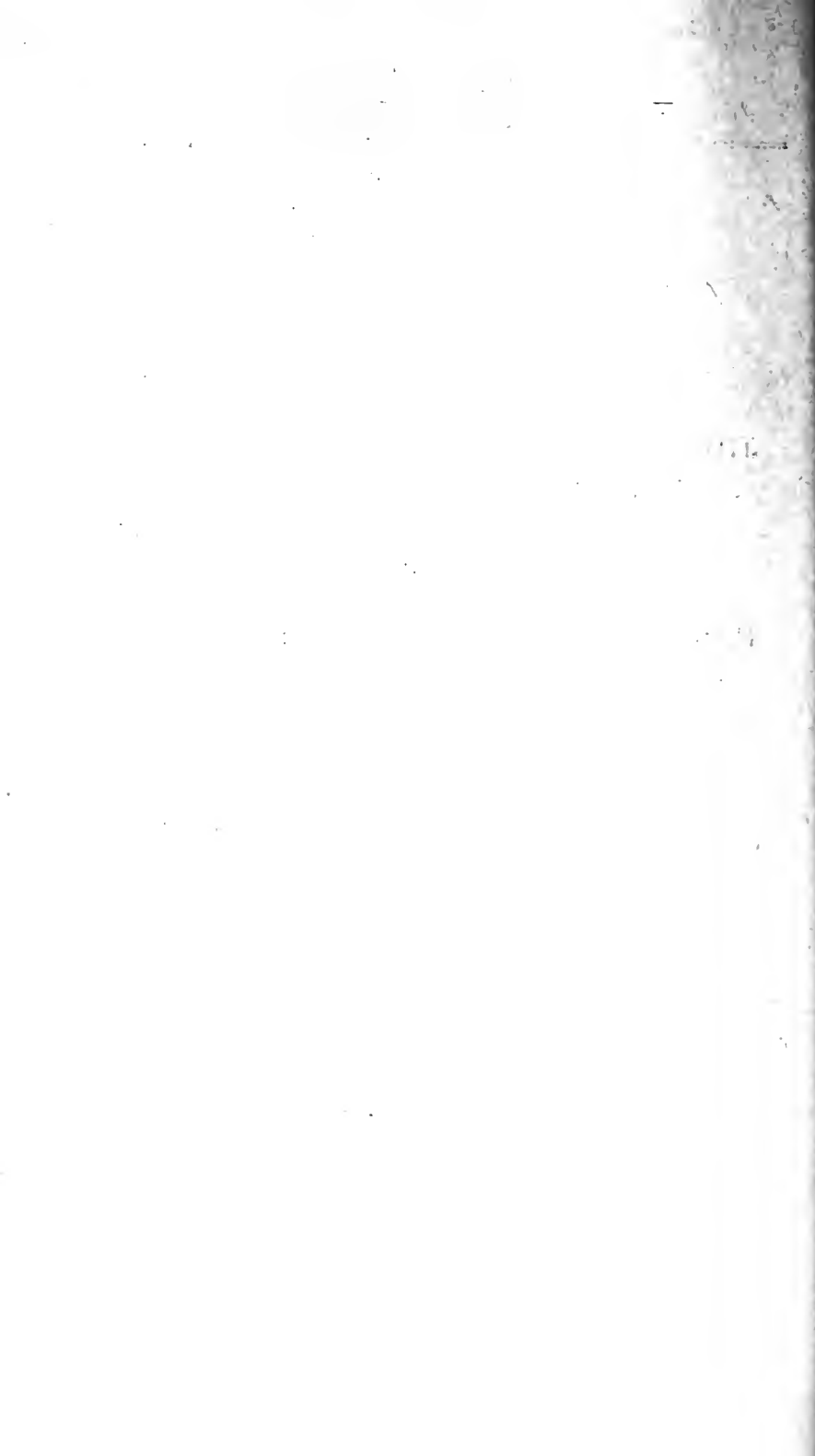
**Appellee.**

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**Supplemental  
Transcript of Record  
Volume IV  
(Pages 1161 to 1169)**

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**Appeal from the United States District Court for the  
Southern District of California  
Central Division.**



In the United States Court of Appeals  
for the Ninth Circuit

Appeal No. 13,352

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,

Appellants,

vs.

FARR COMPANY, a Corporation,

Appellee.

APPELLANTS' MOTION  
UNDER RULE 75

Now come the appellants in the above-entitled appeal and hereby respectfully move, under the provisions of Rule 75(h) of the Rules of Civil Procedure, that the attached order be entered and the record on appeal be supplemented in the manner set forth in such order.

It is hereby certified that this motion is believed to be well founded in law and fact, and that it is not interposed for the purpose of delay.

In support of this motion, appellants will rely upon the facts and reasons stated in the affidavit of counsel attached hereto.

Dated: October 31, 1952.

Respectfully submitted,

OVERTON, LYMAN, PRINCE  
& VERMILLE;

HYDE, MEYER, BALDWIN &  
DORAN,

GEORGE S. BALDWIN;

HARRIS, KIECH, FOSTER &  
HARRIS,

FORD HARRIS, JR.,

DONALD C. RUSSELL,

By /s/ FORD HARRIS, JR.,

Attorneys for Appellants.

[Title of Court of Appeals and Cause.]

### ORDER

Upon motion duly made, and for good cause shown, it is hereby ordered that:

(1) Plaintiff's Memorandum in Opposition to Motion for Summary Judgment, filed in the District Court on or about February 16, 1951, shall be considered a part of the record on appeal, and the Clerk of the District Court shall certify and transmit the same forthwith to the Clerk of the Court of Appeals.

(2) The following portions of said Memorandum shall be printed under the direction of the Clerk of the Court of Appeals as a supplement to the printed record on appeal, and the same shall be added to the printed record on appeal and, together with the unprinted portions thereof, may be considered by the Court on this appeal:

Page 1, lines 1 to 18, inclusive;

Page 3, line 25, to and including the word "strip" in line 30;

Page 4, line 26, to page 5, line 19, to and including the word "angle";

Page 5, line 29, starting with the word "This," to page 6, line 17, inclusive;

Page 7, line 19, to and including the word "application" in line 28;

Page 18, lines 4 to 14, inclusive;

Page 19, line 27, to page 20, line 15, inclusive;

Page 30, lines 10 to 18, inclusive.

Dated: November 10, 1952.

/s/ WILLIAM DENMAN,

/s/ WILLIAM HEALY,

/s/ WALTER L. POPE,

United States Circuit Judges.

[Title of Court of Appeals and Cause.]

### AFFIDAVIT OF FORD HARRIS, JR.

State of California,

County of Los Angeles—ss.

Ford Harris, Jr., being duly sworn, deposes and says:

(1) That affiant is counsel of record for appellants in the above-entitled action.

(2) That a stipulation to the same effect as the contents of the attached Order was by letter requested of Lyon & Lyon, counsel for appellee, on or about October 28, 1952; that on October 30, 1952, by telephone, Mr. Richard F. Lyon, counsel for ap-

pellee, advised affiant that appellee refused to so stipulate in substance or effect.

(3) That the matter sought to be added to the record on appeal by the foregoing motion and order was omitted from the record on appeal by the error and accident of affiant.

(4) That the matter sought to be added to the record on appeal is material to the rights of appellants and its presentation of its appeal herein; that such matter sought to be added contains statements by appellee in the District Court relative to the nature of the alleged invention of the patent here in suit, and affiant believes that such statements will be helpful to this Court in determining this appeal; that the material sought to be added is attached hereto as "Exhibit A."

(5) That appellants' opening brief is due for filing on November 10, 1952, but that appellee's time for filing its answering brief has not commenced to run.

(6) That the granting of the foregoing motion, in affiant's opinion, cannot prejudice appellee in any way or delay the filing of the briefs in this appeal.

/s/ FORD HARRIS, JR.

Sworn and subscribed to before me this 31st day of October, 1952.

[Seal] /s/ VIRGINIA L. LAFFERTY,  
Notary Public in and for the County of Los Angeles,  
State of California.

My Commission Expires July 21, 1954.



EXHIBIT A

In the United States District Court, Southern  
District of California, Central Division

Civil Action No. 9759-PH

FARR COMPANY, a Corporation,

Plaintiff,

vs.

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,

Defendants.

PLAINTIFF'S MEMORANDUM IN OPPOSITION  
TO MOTION FOR SUMMARY  
JUDGMENT\*

“The form of the Farr filter shown in the patent in suit differs from some of the forms shown in the earlier application in providing an air passage having an angled or an abrupt change in direction. It is this passage which is the essential element of the claims of the Farr patent in suit—not the presence or absence of a flat wire strip.

“The Farr air filters departed from this conventional practice in arranging the wire screens so that the air was intended to flow substantially parallel to the plane of the screen. Application Serial No. 285,904 discloses various forms of air filters of this type. The first form is illustrated in Figures 1 to 4

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\*[Original memorandum filed Feb. 16, 1951.  
U.S.D.C.]

of Application Serial No. 285,904. In this form of air filter there is employed, in addition to a frame, a number of strips of crimped or corrugated wire screen. The corrugations or crimps of alternate strips are caused to incline in opposite directions relative to the direction of the air flow, more particularly illustrated in Figure 3 of Application Serial No. 285,904. Two important characteristics of this form of the Farr filter are to be noted, first, that, as pointed out by the defendants, i.e., between the alternate corrugated strips of wire screen there is not employed any flat strip of wire screen, and, second, that there is no bend or angle in the crimps or corrugations of the strips but that such strips or corrugations form a passage by means of which air can flow entirely through the filter without having either to change direction or to flow through any of the wire screens.

“In Figures 5, 6 and 7 of the application there is shown a form of the invention in which between each pair of crimped or corrugated wire screens there is placed an additional strip of flat wire screen, and in Figures 8 and 9 of the application there is shown a form of filter in which the crimps or corrugations of the wire screen change in direction or angle.

“This angled form of the crimped or corrugated wire is a very important feature of the Farr invention, and, as shown hereafter, is present in the form of the invention shown in the patent in suit, is made an important element of all of the claims of the patent in suit which are at issue in this case, and is

an important element of defendants' accused infringing device.

“One point in connection with Figures 8 and 9 of Application Serial No. 285,904 may be noted, that is that the application does not disclose directly whether any flat wire strips are to be employed between the corrugated strips. We believe obviously the inference is that either practice may be utilized.

“This application was acted upon but once by the Patent Office Examiner, who rejected all of the claims of the application irrespective of their breadth or scope. It was within the six months period, which under the statute Farr had to reply to this action of the Patent Office Examiner, that Farr filed his application for the patent in suit. Thus Application Serial No. 285,904 had not lapsed and was not abandoned when the application for the patent in suit was filed. The application for the patent in suit was thus, in legal effect, a step in the prosecution of the Application Serial No. 285,904.

“The best, and possibly only, proven form of the Farr invention (as shown hereafter from the affidavits and exhibits appearing in the file history of the application for the patent in suit) is the form of filter shown in the patent in suit. The particular form of filter shown in the patent in suit utilizes crimped or corrugated wire screens, the corrugations of which had an angle therein to prevent the direct flow of air through such passages. That form of the invention was illustrated in the earlier application, 285,904, only by Figures 9 and 10 of the application.

“As indicated we have already shown that the earlier filed Farr Application Serial No. 285,904 showed several forms of the Farr invention but only one of these forms of the Farr invention include a crimped or corrugated screen wire which had a bend or an angle in the crimp or corrugation. This is the form of the invention shown in Figures 8 and 9 of the Application Serial No. 285,904. When the application for the patent in suit was filed it was this form of the invention which is the form specifically illustrated and throughout the prosecution of the application for the patent in suit the importance of this angle in the corrugations or crimps of the filter was emphasized.

“Any fair reading of the prosecution of the Farr application for the patent in suit demonstrates that from start to finish of that prosecution Farr asserted that his invention resided in these passages changing in direction; that this was the invention sought to be claimed. This form of the Farr invention was illustrated in Figures 8 and 9 of the earlier application, 285,904, is the only form of the invention shown in the application for the patent in suit, and it is clearly and specifically claimed in the claims in suit. Such invention was never abandoned. The contention of defendants that the file history of the patent in suit indicates any abandonment by Farr of the angled passages or of any filter including such angled passages such as would permit defendants' device to be excluded from the claims of the patent in suit, is in plain, direct conflict with the facts as exhibited in the file history itself. De-

fendants' accused air filter actually includes the very essence of the particular form of the Farr filter which the file history shows was consistently claimed by Farr to be his sole invention and which the file history of the Farr application shows clearly the Patent Office Examiners intended to grant to Farr.

“It is respectfully submitted that Defendants' Motion for Summary Judgment must be denied.

“LYON & LYON,

“LEONARD S. LYON,

“By RICHARD F. LYON,

“RICHARD E. LYON.”

Service of copy acknowledged.

[Endorsed]: Filed November 4, 1952, U.S.C.A.









